

PROJECT MANUAL

PROJECT:

HIGH POINT SCHOOL ADDITION
BID PACKAGE 3

OWNER:

WASHTENAW INTERMEDIATE SCHOOL DISTRICT
1819 South Wagner Road
PO Box 1406
Ann Arbor, MI 48106

TMP PROJECT NO.: 19040
MaMA Project No. 1909

DATE: May 27, 2020

ISSUED FOR: CONSTRUCTION

VOLUME 1- DIVISIONS 00 THRU 14

ARCHITECTS

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**MECHANICAL AND ELECTRICAL
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PH 248-879-5666
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**FOOD SERVICE EQUIPMENT
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POOL CONSULTANT

COUNSILMAN HUNSAKER
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PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

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| 00 0101.01 | Title Page - Volume 2 | CNSTR |
| 00 0115 | List of Drawings | CNSTR |
| 00 3100 | Available Project Information | CNSTR |
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SPECIFICATIONS GROUP

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VOLUME 2 – DIVISIONS 20 THRU 33

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Not Used

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SITE AND INFRASTRUCTURE SUBGROUP

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| 32 3300 | Site Furnishings | CNSTR |
| 32 9200 | Turf and Grasses | CNSTR |
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| 32 9400 | Planting Accessories | CNSTR |

DIVISION 33 – UTILITIES

Not Used

END OF SECTION

SECTION 00 0115 - LIST OF DRAWINGS

LIST OF DRAWINGS

1.01 GENERAL

- A. Drawings: Drawings consist of the Contract Drawings including drawings listed on the TITLE SHEET page of the separately bound drawing set titled FOR CONSTRUCTION - BP#3, dated 05-27-2020 and any subsequent Addenda and Contract modifications which may occur.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

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SECTION 00 3100 - AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 SUMMARY

- A. Project Manual uses Appendixes to organize information that does not conform to 3-part specification formatting as defined by the Construction Specifications Institute (CSI).
 - 1. Appendix information does not have a six-digit number or title as defined by CSI's MasterFormat.

1.02 EXISTING CONDITIONS

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders as Information Available to Bidders, but will not be part of Contract Documents, as follows:
 - 1. Geotechnical Report: Entitled Report on Geotechnical Investigation WISD High Point School, dated January 23, 2020.
 - a. Copy is attached to Project Manual in Appendix 1.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION -- NOT USED

END OF SECTION

TMP Architecture, Inc.
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SECTION 00 8200 - AVAILABILITY OF ELECTRONIC FILES

AVAILABILITY OF ELECTRONIC FILES

1.01 POLICY

- A. As a service to Contractor, subcontractors, vendors, material suppliers and others needing electronic copies of Drawings, the Architect will provide CAD files electronically in accordance with the following policy:
1. By acceptance it is understood and agreed that the data and medium being supplied is to be used only for the project referenced.
 2. It is further understood and agreed that the undersigned will hold TMP Architecture, Inc. and/or Mitchell and Mouat Architects harmless and indemnify TMP Architecture, Inc. and/or Mitchell and Mouat Architects from all claims, liabilities, losses, and so forth, including attorney's fees arising out of the use or misuse of the transferred files.
 3. It is understood and agreed that the files transmitted are prepared from CAD files current at the time of preparation. All files are AutoCAD version 2014 dwg files.
 4. This information does not waive the need to verify and review current field conditions and the status of Addenda and/or Bulletin documentation.
 5. As a record of information to be transmitted, TMP Architecture, Inc. and/or Mitchell and Mouat Architects will prepare a duplicate electronic back-up for its record.
 6. Compensation Fee for providing this material will be as follows:
 - a. Base Fee of \$250 for 1 to 3 Drawings.
 - b. Base Fee of \$500 for 4 to 10 Drawings.
 - c. For each additional Drawing after 10, the fee is \$40 per Drawing.
 - 1) Example: 11 Drawings = \$540.
 7. A signed copy of the Release Form and Fee must be provided before files will be released.

1.02 REQUEST PROCEDURE

- A. To receive Drawing CAD files the Release Form must be completed in full and submitted to the Construction Manager to be forwarded to the Project Manager at TMP Architecture, Inc. and/or Mitchell and Mouat Architects
1. A signed copy of the Release Form must be submitted.
 - a. Faxed or emailed copies will be accepted.
 2. Upon remittance of the signed Release Form and Fee, allow five working days for processing.
 3. Transmission of Drawings will be provided electronically after the receipt of Fee.

1.03 RELEASE FORM

- A. Release Form is located immediately after this Section. Refer to Section 00 8200.01 Electronic Files Release Form.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909



ELECTRONIC FILES RELEASE FORM



Re: Authorization Form for CAD File Transfers
Project Name: High Point School Addition
TMP Project No. : 19040 Bid Package 3
MaMA Project No: 1909-BP3

Dear Sir/Madam:

Per your request, TMP Architecture, Inc. / MaMA will electronically transmit requested CAD files upon receipt of an original signed copy of this form which states the conditions of agreement and the receipt of the required compensation fee.

1. By acceptance it is understood and agreed that the data and medium being supplied is to be used only for the project referenced.
2. It is further understood and agreed that the undersigned will hold TMP Architecture, Inc. and/or Mitchell and Mouat Architects harmless and indemnify TMP Architecture, Inc. and/or Mitchell and Mouat Architects from all claims, liabilities, losses, and so forth, including attorney's fees arising out of the use or misuse of the transferred items.
3. It is understood and agreed that the items transmitted are prepared from CAD files current at the time of preparation. All files are AutoCAD version 2014 dwg files.
4. This information does not waive the need to verify and review current field conditions and the status of Addenda and/or Bulletin documentation.
5. As a record of information to be transmitted, TMP Architecture, Inc. and/or Mitchell and Mouat Architects will prepare a duplicate electronic back-up for its record.
6. Compensation for providing this material will be as follows:
 - a. Base Fee of \$250 for 1 to 3 Drawings.
 - b. Base Fee of \$500 for 4 to 10 Drawings.
 - c. For each additional Drawing after 10 the fee is \$40 per Drawing.
 - d. Example: 11 drawings = \$540.
7. Payment must be provided along with a signed copy of this form before files will be released. Please remit to Construction Manager to be forwarded to the Project Manager at TMP Architecture, Inc. and/or Mitchell and Mouat Architects and allow five working days for processing.

Fee: \$ _____ Requested Drawings: _____

Firm Requesting Files:

Company: _____

Address: _____

Signed: _____ Date: _____

Printed Name / Title: _____

Phone: _____ Email: _____

To Be Completed By TMP Architecture, Inc. / Mitchell and Mouat Architects

| |
|---|
| Released (signed by): _____ TMP Architecture, Inc. or Mitchell and Mouat Architects |
| Printed Name/Title: _____ Date: _____ |

SECTION 01 0005 - RELATED REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Related requirements.

1.02 RELATED REQUIREMENTS

- A. Section 01 2300 - Alternates: Descriptions of items, administrative requirements.
- B. Section 01 4000 - Quality Requirements: Procedures for testing, inspection, mock-ups, reports, certificates; use of reference standards.
- C. Section 01 4100 - Regulatory Requirements.
- D. Section 01 4216 - Definitions.
- E. Section 01 4219 - Reference Standards: Consolidated list of citations with edition dates.
- F. Section 01 4533 - Code-Required Special Inspections and Procedures.
- G. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.
- H. Section 01 7000 - Execution and Closeout Requirements: Examination, preparation, and general installation procedures; preinstallation meetings; cutting and patching; cleaning and protection; starting of systems; demonstration and instruction; closeout procedures except payment procedures; requirements for alterations work.
- I. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.
- J. Section 02 4100 - Demolition: Selective demolition, site demolition, structure removal.

1.03 DIVISION 00 AND DIVISION 01

- A. Unless otherwise noted, all provisions of sections and documents in Division 00 and Division 01, including, but not limited to, General Conditions and Supplementary Conditions, relate and apply to all sections and documents within Project Manual; including, but not limited to, sections and documents in Division 00 through Division 48.

1.04 DRAWINGS

- A. Unless otherwise noted, Drawings relate and apply to all specification sections and documents within Project Manual; including, but not limited to, sections and documents in Division 00 through Division 48.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION -- NOT USED

END OF SECTION

TMP Architecture, Inc.
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SECTION 01 2200 - UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Measurement and payment criteria applicable to Work performed under a unit price payment method.

1.02 COSTS INCLUDED

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.03 MEASUREMENT OF QUANTITIES

- A. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.
- B. Assist by providing necessary equipment, workers, and survey personnel as required.
- C. Measurement by Area: Measured by square dimension using mean length and width or radius.
- D. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.

1.04 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.
- B. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products remaining on hand after completion of the Work.

1.05 SCHEDULE OF UNIT PRICES

- A. Unit Price 1 - Natatorium Tank Tile Replacement
 - 1. Description: As part of the base bid, the Contractor shall perform a sound testing of the existing interior pool tile finish and carry 500 SF for replacement at areas not adhering, around existing embeds that require replacement, or where there is discoloration or rust bleed-through. Contractor shall submit unit pricing per additional 100 SF that is deemed necessary for replacement following the sound testing. Refer to sheet SP0.0-BP3.
 - 2. Unit of Measurement: Square Feet.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
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SECTION 01 2300 - ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Description of Alternates.

1.02 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.
- C. Alternate No. One (01) - North Playground at House No. 5:
1. Base Bid Item: Groundcover per Drawing number C4.3-BP3.
 2. Alternate Item: Drawing number C4.2-BP3.
 - a. Provide and install all new play equipment and install owner supplied play equipment indicated, including all site amenities indicated in the Documents at the North Playground associated with House No. 5 - including:
 - 1) Install owner supplied Cruise Line.
 - 2) Provide and install Rox All See Saw.
 - 3) Provide and install double arch swing.
 - 4) Provide and install sway bench.
 - 5) Provide and install Rubberbond poured in place safety surfacing system.
 - 6) Install 10 feet high Elite EFF-20 Industrial Grade Fence with two gates.
 - 7) Install Gametime 8 feet Portable Bench.
 - 8) Install Concrete.
 - 9) Install Portable Basketball Hoop provided by owner (existing on-site).
 - 10) Paint 3-Point Lines and Free Throw Line.
- D. Alternate No. Two (2) - Natural Features Pathways and Landscape::
1. Base Bid Item: N/A
 2. Alternate Item: Drawing numbers L1-BP3, L2-BP3, and L3-BP3.
 - a. Play Mounds - including:
 - 1) Earthwork
 - 2) Fine grading and seeding
 - 3) All other related work indicated on other Drawings within the documents.
 - b. ADA accessible 6'-0" wide, 3" asphalt sidewalk with nodes - including all other related work indicated on these Documents, such as:
 - 1) Soil erosion and sedimentation control measures
 - 2) Vegetation protection measures
 - 3) Demolition
 - 4) Grading
 - 5) Fine grading and seeding
 - c. Tree and shrub planting - including all other related work indicated on these Documents, such as:
 - 1) Planting soil and mulch.
 - 2) Plant maintenance and guarantee
- E. Alternate No. Three (03) - Natural Features Pavilion::
1. Base Bid Item: N/A
 2. Alternate Item: Section 02 8100 Wood Vegetable Planters, 06 1323 Heavy Timber Framing, 06 1500 - Wood Decking, 07 4113 - Metal Roof Panels and Drawing number L1-BP3, L2-BP3, L4-BP3, A1.1P-BP3, M0.2-BP3 including:
 - a. Pavilion structure and all associated foundations.
 - b. Concrete pad and walkway and associated base material.
 - c. Water, electrical feeds, fixtures, sleeves, and spigots associated with the Pavilion.
 - d. Soil erosion and sedimentation control measures.
 - e. Grading and layout of the Pavilion.

- f. Raised and at-grade wood vegetable planters and picket fence with gate included.
 - g. Including all other related work indicated on these Documents such as: tree, shrub and perennial plantings, planting soil and mulch, plant maintenance and guarantee associated with the Pavilion.
- F. Alternate No. Four (04) - Two Shade Structures:
- 1. Base Bid Item: N/A
 - 2. Alternate Item: Section 02 8100 Wood Vegetable Planters, 06 1323 Heavy Timber Framing, 06 1500 - Wood Decking, 07 4113 - Metal Roof Panels and Drawing number L1-BP3, L2-BP3, L4-BP3, A1.1P-BP3 including:
 - a. Shade Structures and all associated foundations.
 - b. Concrete pad and walkway and associated base material.
 - c. Electrical feeds, fixtures, and sleeves Shade Structures.
 - d. Soil erosion and sedimentation control measures.
 - e. Grading and layout of the Shade Structures.
 - f. Including all other related work indicated on these Documents such as: tree, shrub and perennial plantings, planting soil and mulch, plant maintenance and guarantee associated with the Shade Structures.
- G. Alternate No. Five (05) - Natatorium Deck Tile:
- 1. Base Bid Item: Section 09 3000 and Drawing number A10.1E-BP3 including patch existing pool deck tile with tile CT6..
 - 2. Alternate Item: Section 09 3000 and Drawing number A10.1E-BP3 including In lieu of patching existing pool deck tile, replace pool deck tile with tile CT5 and drain covers as noted and indicated on drawings..
- H. Alternate No. Six (06) - UV System at Natatorium:
- 1. Base Bid Item: N/A.
 - 2. Alternate Item: Section 13 1100 - Swimming Pools and Drawing number SP0.0-BP3 including Contractor shall furnish and install a medium pressure ultraviolet dechloramination and disinfection system to handle 100% of the recirculation flow per drawings and specifications..
- I. Alternate No. Seven (07) - Walk-off Carpet at Lobby:
- 1. Base Bid Item: Section 03 3511 Concrete Floor Finishes and Drawing number A10.1B-BP3 including provide concrete decorative/applied finish at Lobby B101.
 - 2. Alternate Item: Section 09 6813 Tile Carpeting and Drawing number A10.1B-BP3 including in Lieu of concrete decorative/applied finish, provide Walk-off Carpet (CPT2) at Lobby B101.
- J. Alternate No. Eight (08) - Quiet Room Seamless Safety Padding:
- 1. Base Bid Item: Section 11 6623 Gymnasium Equipment and Drawing number A1.1D-BP3, A1.1F-BP3, A1.1G-BP3, A1.1K-BP3, A6.2, A6.4-BP3, A10.1D-BP3, A10.1F-BP3, A10.1G-BP3, A10.1K-BP3 including provide Wall Safety Pads at Quiet Room D105, Quiet Room D114, Quiet Room F111, Quiet Room G114b, and Quiet Room K110.
 - 2. Alternate Item: Section 10 0100 Miscellaneous Specialties and Drawing number A1.1D-BP3, A1.1F-BP3, A1.1G-BP3, A1.1K-BP3, A6.2, A6.4-BP3, A10.1D-BP3, A10.1F-BP3, A10.1G-BP3, A10.1K-BP3 including provide Seamless Safety Padding at Quiet Room D105, Quiet Room D114, Quiet Room F111, Quiet Room G114b, and Quiet Room K110.
- K. Alternate No. Nine (09) - Color Tuning of Light Fixtures:
- 1. Base Bid Item: Drawing number E7.4-BP3 including Light Fixture Type L1 as specified.
 - 2. Alternate Item: Drawing number E7.4-BP3 including Light Fixture Type L1: Provide color tunable white with slider color temperature control for each switch leg as noted..

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 01 2500.01 - TMP/MaMA Substitution Request Form.
- B. Section 01 2300 - Alternates, for product alternatives affecting this section.
- C. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.
- D. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. Forms included in the Project Manual are adequate for this purpose, and must be used.
- D. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Substitution Request Form: TMP/MaMA Substitution Request Form must be completed and provided at the beginning of each substitution request.
 - 1. Refer to Section 01 2500.01 - TMP/MaMA Substitution Request Form.
 - 2. Submittals without a completed TMP/MaMA Substitution Request Form will not be acknowledged, reviewed, or returned. Use only this form; other forms of submission are unacceptable.
- B. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period.

3.03 **SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Substitution Request Form: TMP/MaMA Substitution Request Form must be completed and provided at the beginning of each substitution request.
 - 1. Refer to Section 01 2500.01 - TMP/MaMA Substitution Request Form.
 - 2. Submittals without a completed TMP/MaMA Substitution Request Form will not be acknowledged, reviewed, or returned. Use only this form; other forms of submission are unacceptable.
- B. Submit request for Substitution for Cause immediately upon discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
 - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 - 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
 - b. Other unanticipated project considerations.
- D. Substitutions will not be considered under one or more of the following circumstances:
 - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.

3.04 **RESOLUTION**

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
 - 1. During construction, Architect's decision following review of proposed substitution will be noted on the submitted form.
 - 2. During bidding, Architect will approve substitution requests by issuing an Addendum. Substitutions not approved by addendum are rejected.

3.05 **ACCEPTANCE**

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.06 **CLOSEOUT ACTIVITIES**

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

END OF SECTION



SUBSTITUTION REQUEST FORM

Substitution Request Number: _____ Date Submitted: _____
TMP/MaMA Project Number: _____ Project Name: _____

SPECIFIED ITEM

Specification Title: _____
Specification Section: _____ Specification Article/Paragraph: _____
Specified Product / Description: _____
Specified Manufacturer: _____
Specified Product / Model: _____
Reason specified item cannot be provided: _____

PROPOSED SUBSTITUTION

Description of Proposed Substitution: _____
Proposed Manufacturer: _____
Address: _____
Website: _____
Product / Model: _____
Years manufacturer has been in business: _____ Years product/model has been manufactured: _____
Differences between proposed substitution and specified item: _____

Will proposed substitution affect other parts of work? No Yes
If Yes, explain how: _____

How will substitution benefit the Owner: Cost savings Time savings Other
Provide specific details: _____

The following information is required; check to indicate information is attached. (Request will be rejected without required data)

- List of references where proposed product has been installed; include address, owner, architect, and date installed.
- Product data sheets.
- Applicable certificates and test reports.
- Comparative Data: Provide point-by-point, side-by-side comparison of specified product and proposed substitution addressing essential attributes specified.

Indicate which of the following voluntary information is attached, if any:

- Drawings.
 - Samples.
 - Other Items: _____
-

SIGNATURE

The undersigned certifies:

- The proposed substitution meets or exceeds the quality level of the specified product, equipment, assembly, or system.
- To provide the same warranty for the substitution as for the specified product.
- Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
- Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
- The proposed substitution will have no adverse effects on other work.
- The proposed substitution will not affect project schedule.
- Waives claims for additional costs or time extension that may subsequently become apparent.

Contractor / Company: _____

Signed By: _____ Printed Name: _____

Title: _____

Address: _____

Email: _____ Phone: _____

ARCHITECT'S RESPONSE

- During bidding, Architect will approve substitution requests by issuing an Addendum. Substitutions not approved by addendum are rejected.
- During construction, Architect will notify Contractor in writing (see below) of decision to accept or reject request, and incorporate the substitution into the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments as provided for in the Conditions of the Contract.

Substitution Approved - Provide submittals per Section 01 3000 and respective section for which substitution was made.

Substitution Rejected - Provide specified materials.

Signed By: _____ Printed Name: _____

Architect's Comments: _____

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals for review, information, and project closeout.
- B. Number of copies of submittals.
- C. Requests for Interpretation (RFI) procedures.
- D. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000.01 - TMP/MaMA Submittal and Sample Transmittal Form.
- B. Section 01 6000 - Product Requirements: General product requirements.
- C. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- D. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 REFERENCE STANDARDS

- A. AIA G716 - Request for Information 2004.
- B. CSI/CSC Form 13.2A - Request for Interpretation Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SCHEDULE

- A. Include written certification that major contractors have reviewed and accepted proposed schedule.
- B. Graphically indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Record actual start and finish dates of completed activities.

3.02 REQUESTS FOR INTERPRETATION (RFI)

- A. The Construction Manager will coordinate and issue all RFI's along the following guidelines.
- B. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 - 2. Prepare in a format and with content acceptable to Architect. Use one of the following:
 - a. Use AIA G716 - Request for Information .
 - b. Use CSI/CSC Form 13.2A - Request for Interpretation.
 - c. Other format acceptable to Architect.
 - 3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.

1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response and may include an explanatory notation.
 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response and may include an explanatory notation.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Discrete and consecutive RFI number, and descriptive subject/title.
 3. Issue date, and requested reply date.
 4. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 5. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 6. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.
 3. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 3:00 PM will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.

4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.03 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 1. Submit at the same time as the preliminary schedule.
 2. Coordinate with Contractor's construction schedule and schedule of values.
 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 4. Arrange information to include scheduled date for initial submittal, specification number and title, description of item of work covered, and role and name of subcontractor.
 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.04 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.05 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Certificates.
 3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.07 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy.

- B. Samples: Submit the number specified in individual specification sections, but not less than 3; one (minimum) of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES

- A. Transmittal Form: TMP/MaMA Submittal and Sample Transmittal Form must be completed and provided at the beginning of each submittal.
 - 1. Refer to Section 01 3000.01 - TMP/MaMA Submittal and Sample Transmittal Form.
 - 2. Submittals without a completed TMP/MaMA Submittal and Sample Transmittal Form will not be acknowledged, reviewed, or returned.
- B. Submittals shall be submitted in electronic form.
 - 1. Exceptions: Physical samples.
 - a. Physical Samples must be accompanied by an electronic copy and a hard/physical copy of the completed TMP/MaMA Submittal and Sample Transmittal Form.
- C. Electronic Submittals: Comply with the following:
 - 1. Submittal process shall be through a data management system (i.e. Connect) or other approved method agreed to by the Architect and Owner.
 - 2. File Format: Portable Document Format (PDF).
 - 3. File Naming: File naming shall be in the following format:
 - a. Specification section number, followed by a hyphen, and a consecutive number indicating sequential submittals for that section; followed by a general description of the submittal contents.
 - 1) Examples:
 - (a) Section 07 9200; first submittal:
 - (1) 07 9200-01 Joint Sealants
 - (b) Section 07 9200; second submittal:
 - (1) 07 9200-02 Joint Sealant Color
 - b. Resubmittals. For revised resubmittals use original number and a sequential combination numerical and alphabetical suffix; hyphen followed by "R" and a two-digit consecutive number indicating sequential resubmittals for that particular submittal.
 - 1) Examples:
 - (a) Section 07 9200; resubmittal of first submittal of section:
 - (1) 07 9200-01-R01 Joint Sealants.
 - (b) Section 07 9200; second resubmittal of first submittal of section:
 - (1) 07 9200-01-R02 Joint Sealants
 - (c) Section 07 9200; first resubmittal of second submittal of section:
 - (1) 07 9200-02-R01 Joint Sealant Color
 - 4. Each Submittal shall be one file, complete with all attachments.
 - a. Multi-file submittal will not be acknowledged, reviewed, or returned.
 - D. General Requirements:
 - 1. Use a single transmittal for related items.
 - a. Each transmittal shall be for one specification section only; do not submit items for multiple sections under the same transmittal.
 - 1) Multi-section submittals will be acknowledged and returned; stamped "X - Not Approved - Resubmit".
 - 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 - 3. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.

4. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 5. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 14 calendar days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 calendardays.
 6. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 7. When revised for resubmission, identify all changes made since previous submission.
 8. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 9. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 10. Submittals not requested will be recognized and returned; stamped "NA - No Action Taken - Not Reviewed"
- E. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Submit concurrently with related shop drawing submittal.
 4. Do not submit (Material) Safety Data Sheets for materials or products unless specifically called for in individual sections.
- F. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 2. Do not reproduce Contract Documents to create shop drawings.
 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
 4. Non-complying submittals will be acknowledged and returned; stamped "X - Not Approved - Resubmit".
- G. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
 3. Submit actual physical samples.
 4. Electronic submittals will not be accepted unless prior approval is received from the Architect. Electronic samples without prior approval will be acknowledged and returned; stamped "X - Not Approved - Resubmit."

3.09 SUBMITTAL REVIEW

- A. General: Submittals that do not conform to the requirements of this section will not be acknowledged, reviewed, or returned.
- B. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- C. Submittals for Information: Architect will acknowledge and may review. See below for actions to be taken.
- D. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 1. Where more than one action has been indicated, each shall apply to that portion of the submittal for which the action is indicated.
- E. Architect's review shall not indicate approval of dimensions, quantities or fabrication processes unless specific notations are made by the Architect regarding same.
- F. Architect's and consultants' actions on items submitted for review:

1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Reviewed - No Exceptions Taken", "Approved", or language with same legal meaning.
 - b. "Reviewed with Corrections Noted", "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Not Approved - Resubmit", "Revise and Resubmit", or language with the same legal meaning.
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
- G. Architect's and consultants' actions on items submitted for information:
1. Items for which no action was taken:
 - a. "No Action Taken - Not Reviewed" or "Received" - to notify the Contractor that the submittal has been received for record only.

END OF SECTION

| CONST. MANAGER / CONTRACTOR | | PROJECT | TMP PROJECT NO. | DATE SUBMITTED | SUBMITTAL NO. | | | | | | |
|--|------------------------------|--------------------|-----------------|--|-------------------|--------------------------|---------------|-----------------|--|-----------|--|
| Name and Address: | | Title: | | | | | | | | | |
| | | | * ACTION CODES | | Initial Submittal | <input type="checkbox"/> | | | | | |
| | | | R | Reviewed – No Exceptions Taken | Resubmittal | <input type="checkbox"/> | | | | | |
| | | | RN | Reviewed with Corrections Noted | | | | | | | |
| Email: | | Location: | RR | Revise and Resubmit | REVIEWED BY | | | | | | |
| | | | X | Not Approved – Resubmit | TMP | <input type="checkbox"/> | | | | | |
| Phone: | | | NA | No Action Taken – Not Reviewed | Consultant | <input type="checkbox"/> | | | | | |
| | | | | | | Reviewer: | | | | | |
| SPECIFICATION SECTION NO. | SUBCONTRACTOR / MANUFACTURER | ITEM DESCRIPTION | NO. OF SAMPLES | NO. OF SAMPLES RETURNED | ACTION CODE * | DATE REVIEWED | DATE RETURNED | | | | |
| Transmittal shall be for one specification section only; do not submit items from multiple sections under the same transmittal. Multi-section submittals will be returned; stamped "X - Not Approved - Resubmit" | | | | | | | | | | | |
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| <i>Submittal Stamps may be placed on subsequent blank page.</i> | | | | | | | | | | | |
| CONTRACTOR COMMENTS | | ARCHITECT COMMENTS | | The undersigned certifies that the above submitted items have been reviewed in detail and are correct and in strict conformance with the Contract Documents except as otherwise noted. NOTE: Approval of items submitted does not relieve Contractor from complying with all requirements of the Contract Documents. | | | | | | | |
| | | | | | | | | CONTRACTOR NAME | | | |
| | | | | | | | | | | SIGNATURE | |
| | | | | | | | | | | | |



SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Contractor's design-related professional design services.
- F. Control of installation.
- G. Mock-ups.
- H. Tolerances.
- I. Manufacturers' field services.
- J. Defect Assessment.

1.02 REFERENCE STANDARDS

- A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection 2020.
- B. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing 2015.
- C. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components 2016.

1.03 DEFINITIONS

- A. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- B. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.04 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
 - 1. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 - 2. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- C. Test Reports: After each test/inspection, promptly submit 1 copies of report to Architect and to Contractor.
 - 1. Include:

- a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, 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.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time specialist and responsible officer.
- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.07 REFERENCES AND STANDARDS

- A. Obtain copies of standards where required by product specification sections.
- B. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

1.08 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, and ASTM E699.
 2. Inspection agency: Comply with requirements of ASTM E329.

3. Laboratory Staff: Maintain a full time specialist on staff to review services.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
- D. Notify Architect 5 working days in advance of dates and times when mock-ups will be constructed.
- E. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.
- F. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- G. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- H. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
 - 1. Make corrections as necessary until Architect's approval is issued.
- I. Accepted mock-ups shall be a comparison standard for the remaining Work.
- J. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. 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/inspections specified.
- C. Limits on Testing/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.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 48 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification 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 equipment 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.

3.06 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4100 - REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

- A. Regulatory requirements applicable to this project are the following:
 - 1. Barrier Free Code: Comply with the following:
 - a. Michigan Building Code; 2015.
 - b. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
 - 2. School Fire Safety Rules: Michigan School Fire Safety Rules; 2016.
 - a. Includes NFPA 101-2012 - Life Safety Code; 2012, plus amendments.
 - 3. Building Code: Michigan Building Code; 2015.
 - 4. Plumbing Code: Michigan Plumbing Code; 2015.
 - 5. Mechanical Code: Michigan Mechanical Code; 2015.
 - 6. Electrical Code: NFPA 70 - National Electric Code; 2017.
 - a. Includes 2017 Michigan Construction Code - Part 8 Electrical Code Rules.
 - 7. Boiler Code: Michigan Boiler Code.
 - a. Includes the following:
 - 1) ASME Boiler and Pressure Vessel Codes; 2010, plus 2011 addenda.
 - 2) National Board Inspection Code; 2011.
 - 3) PA 407 Skilled Trades Regulation Act; 2016.
 - 8. Energy Code: Michigan Energy Code; 2015.
 - a. Includes ASHRAE Std 90.1 I-P-2013- Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013.
- B. Where specification sections reference more current standards or codes, comply with the more restrictive requirements unless notified in writing by Architect.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 4216 - DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. This section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Provide: To furnish and install.
- F. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 4219 - REFERENCE STANDARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements relating to referenced standards.

1.02 QUALITY ASSURANCE

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with the reference standard of date of issue specified in this section, except where a specific date is established by applicable code.
- C. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION -- NOT USED

END OF SECTION

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SECTION 01 4533 - CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Code-required special inspections.
- B. Submittals.

1.02 ABBREVIATIONS AND ACRONYMS

- A. AHJ: Authority having jurisdiction.
- B. NIST: National Institute of Standards and Technology.

1.03 DEFINITIONS

- A. 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.
- B. 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 REFERENCE STANDARDS

- A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection 2020.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency is required to:
 - 1. 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.
 - 2. Submit certification that Special Inspection Agency is acceptable to AHJ.
- C. Special Inspection Reports: After each special inspection, Special Inspector is required to promptly submit at least two copies of report; one to Architect and one to the AHJ.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of Special Inspector.
 - d. Date and time of special inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of special inspection.
 - h. Date of special inspection.
 - i. Results of special inspection.
 - j. Compliance with Contract Documents.
 - 2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.
- D. Fabricator Special Inspection Reports: After each special inspection of fabricated items at the Fabricator's facility, Special Inspector is required to promptly submit at least two copies of report; one to Architect and one to AHJ.

1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of Special Inspector.
 - d. Date and time of special inspection.
 - e. Identification of fabricated item and specification section.
 - f. Location in the Project.
 - g. Results of special inspection.
 - h. Verification of fabrication and quality control procedures.
 - i. Compliance with Contract Documents.
 - j. Compliance with referenced standard(s).
- E. Test Reports: After each test or inspection, promptly submit at least two copies of report; one to Architect and one to AHJ.
 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test or inspection.
 - h. Date of test or inspection.
 - i. Results of test or inspection.
 - j. Compliance with Contract Documents.

1.06 SPECIAL INSPECTION AGENCY

- A. 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.

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.

END OF SECTION

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Re-use of existing products.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- D. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required.
 - 1. Refer to Drawings and Section 02 4100 - Demolition.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- D. Available Products: Products specified by naming one or more Manufacturers as an Available Product indicates that these Manufacturers' products may be provided but other comparable products and Manufacturers not named may also be provided without submitting a request for substitution.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.02 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 3. Handle, store, install and finish products.
 - 4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- F. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- G. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide off-site storage and protection when site does not permit on-site storage or protection.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.

- I. Do not store products directly on the ground.
- J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- L. Prevent contact with material that may cause corrosion, discoloration, or staining.
- M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

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SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- J. General requirements for maintenance service.

1.02 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2019.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
 - 6. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work and products to be used.
 - e. Effect on work of Owner or separate Contractor.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities.
- D. Warranties: For each affected material under warranty, submit written verification, signed by manufacturer of existing materials, stating that the Owner's full warranty will remain in effect after cutting and patching operations have been completed

1.04 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.05 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Perform dewatering activities, as required, for the duration of the project.

- E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
 - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- H. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
 - 2. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.
- I. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- J. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.07 WARRANTIES

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect 5 calendar days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with 1 copy to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- G. Utilize recognized engineering survey practices.
- H. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 2. Grid or axis for structures.
 3. Building foundation, column locations, ground floor elevations.
 4. Controlling lines and levels required for mechanical and electrical trades.
- I. Periodically verify layouts by same means.
 - J. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation only.
 1. Verify that construction and utility arrangements are as indicated.
 2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 1. Provide, erect, and maintain temporary dustproof partitions.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
 1. Remove items indicated on drawings.
 2. Relocate items indicated on drawings.
 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

- a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
- b. Provide temporary connections as required to maintain existing systems in service.
4. Verify that abandoned services serve only abandoned facilities.
5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
 1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 1. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean existing systems and equipment.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
- M. Comply with all other applicable requirements of this section.

3.07 **CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 1. Complete the work.
 2. Fit products together to integrate with other work.
 3. Provide openings for penetration of mechanical, electrical, and other services.
 4. Match work that has been cut to adjacent work.
 5. Repair areas adjacent to cuts to required condition.
 6. Repair new work damaged by subsequent work.
 7. Remove samples of installed work for testing when requested.
 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- J. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - a. This includes painted surfaces.
 - b. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.08 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.09 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.10 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner 7 calendar days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify 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 applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' 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 that equipment or system has been properly installed and is functioning correctly.

3.11 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.
- E. 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.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.12 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.13 FINAL CLEANING

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.14 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Contractor on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.15 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 7329 - CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cutting and patching.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements.
- B. Section 01 6000 - Product Requirements.
- C. Section 01 7000 - Execution and Closeout Requirements.
- D. Section 07 8400 - Firestopping.

1.03 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
 - 6. Include in request:
 - a. Location and description of affected work.
 - b. Necessity for cutting or alteration.
 - c. Description of proposed work and products to be used.
 - d. Effect on work of Owner or separate Contractor.
- C. Warranties: For each affected material under warranty, submit written verification, signed by manufacturer of existing materials, stating that the Owner's full warranty will remain in effect after cutting and patching operations have been completed.

1.05 WARRANTIES

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

- B. Prior to Patching: Before patching, verify compatibility and suitability of substrates, including compatibility with existing finishes or primers. Beginning of patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.
- D. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
- E. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.03 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-conforming work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cutting:
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces.
 - 2. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
 - 3. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400 - Firestopping, to full thickness of the penetrated element.
- I. Patching:
 - 1. Repair adjacent construction and finishes damaged during removal work and cutting work.
 - 2. Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

3. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - a. This includes painted surfaces.
 - b. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
4. Match color, texture, and appearance.
5. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

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SECTION 01 7800 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. General:
 - 1. Project Record Documents include:
 - a. Complete set of Record Drawings.
 - b. Complete set of Record Submittals.
 - c. Complete set of Specifications.
 - 2. Project Record Documents shall be submitted in electronic form.
 - a. File Format: Portable Document Format (PDF).
 - b. Files shall be named and organized in a searchable, easy to understand, system.
 - 3. Ensure entries are complete and accurate, enabling future reference by Owner.
 - 4. Record information concurrent with construction progress.
- B. Record Drawings: Record Drawings shall include the following:
 - 1. Complete set of Drawings.
 - a. Indicate and record actual construction including, but not limited to, the following:
 - 1) Show all systems and assemblies as they exist at completion of the Work.
 - 2) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

- 3) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4) Field changes of dimension and detail.
 - 5) Details not on original Contract drawings.
2. Addenda.
 3. Change Orders and other modifications to the Contract.
- C. Record Submittals: Record Submittals shall include the following:
1. Complete set of Submittals, including resubmittals.
 2. Shop Drawings shall indicate all field changes and other variations from the Submittal as originally reviewed by Architect.
- D. Specifications: Specifications shall include the following:
1. Complete Project Manual including all specifications, front end material, reports, and information available to bidders, as originally bid.
 2. Addenda.
 3. Change Orders and other modifications to the Contract.
- 3.02 OPERATION AND MAINTENANCE DATA**
- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- 3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**
- A. For Each Product, Applied Material, and Finish:
1. Product data, with catalog number, size, composition, and color and texture designations.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Additional information as specified in individual product specification sections.
- D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- 3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**
- A. For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.

- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Include test and balancing reports.
- N. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. General:
 - 1. Operational and Maintenance Manuals include:
 - a. Operational and maintenance data.
 - b. Operational and maintenance data for materials and finishes.
 - c. Operational and maintenance data for equipment and systems.
 - 2. Operational and Maintenance Manuals shall be submitted both in electronic form and as hard copy/durable manuals.
 - a. Subject to Owner approval, hard copy/durable manuals may be omitted.
 - b. Electronic File Format: Portable Document Format (PDF).
 - 1) Files shall be named and organized in a searchable, easy to understand, system similar to the descriptions for the hard copy/durable manuals
- B. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- C. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- D. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 3 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- E. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- F. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- G. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- H. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- I. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- J. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

- K. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Operation and maintenance data.
 - c. Field quality control data.
 - d. Photocopies of warranties and bonds.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. 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 product or work item.
- H. 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, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 01 9113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
 - 1. Verify that the work is installed in accordance with Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
 - 2. Verify and document that functional performance is in accordance with Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
 - 3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
 - 4. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.
- B. The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.

1.02 SCOPE OF COMMISSIONING

- A. The following are to be commissioned:
- B. Fire Protection Systems.
- C. Plumbing Systems:
 - 1. Water heaters.
 - 2. Booster pumps.
- D. HVAC System, including:
 - 1. Major and minor equipment items.
 - 2. Piping systems and equipment.
 - 3. Ductwork and accessories.
 - 4. Terminal units.
 - 5. Control system.
 - 6. Sound control devices.
 - 7. Vibration control devices.
 - 8. Variable frequency drives.
- E. Electrical Systems:
 - 1. Power quality.
 - 2. Emergency power systems.
 - 3. Uninterruptible power systems.
 - 4. Lighting controls other than manual switches.
- F. Electronic Safety and Security:
 - 1. Security system, including doors and hardware.
 - 2. Fire and smoke alarms.
- G. Communications:
- H. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

1.03 REFERENCE STANDARDS

- A. ASHRAE Std 202 - Commissioning Process for Buildings and Systems 2018.
- B. CSI/CSC MF - Masterformat 2016.
- C. PECE (Samples) - Sample Forms for Prefunctional Checklists and Functional Performance Tests Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority, unless they require review by Architect; in that case, submit to Architect first.
 - 2. Submit one copy to the Commissioning Authority, not to be returned.
 - 3. Make commissioning submittals on time schedule specified by Commissioning Authority.
 - 4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word 2010 preferred.
 - 5. As soon as possible after submittals made to Architect are approved, submit copy of approved submittal to the Commissioning Authority.
- B. Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
 - 1. Manufacturer's product data, cut sheets, and shop drawings.
 - 2. Manufacturer's installation instructions.
 - 3. Startup, operating, and troubleshooting procedures.
 - 4. Fan and pump curves.
 - 5. Factory test reports.
 - 6. Warranty information, including details of Owner's responsibilities in regard to keeping warranties in force.
- C. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.
- D. Startup Plans and Reports.
- E. Completed Prefunctional Checklists.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
 - 1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 degree F and resolution of plus/minus 0.1 degree F.
 - 2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
 - 3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.
- C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.
- D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
 - 1. Dataloggers required to for Functional Tests will be provided by the Commissioning Authority and will not become the property of Owner.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

- A. Commissioning Authority will prepare the Commissioning Plan.
 - 1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
 - 2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.
- B. Contractor is responsible for compliance with the Commissioning Plan.
- C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.
- D. Commissioning Schedule:
 - 1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after award of Contract.
 - 2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
 - 3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
 - 4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 DOCUMENTATION IDENTIFICATION SYSTEM

- A. Give each submitted form or report a unique identification; use the following scheme.
- B. Type of Document: Use the following prefixes:
 - 1. Startup Plan: SP-
 - 2. Startup Report: SR-
 - 3. Prefunctional Checklist: PC-
 - 4. Functional Test Procedure: FTP-
 - 5. Functional Test Report: FTR-
- C. System Type: Use the first 4 digits from CSI/CSC MF (Master Format), that are applicable to the system; for example:
 - 1. 2300: HVAC system as a whole.
 - 2. 2320: HVAC Piping and Pumps.
 - 3. 2330: HVAC Air Distribution.
- D. Component Number: Assign numbers sequentially, using 1, 2, or 3 digits as required to accommodate the number of units in the system.
- E. Test, Revision, or Submittal Number: Number each successive iteration sequentially, starting with 1.
- F. Example: PC-2320-001.2 would be the Prefunctional Checklist for equipment item 1 in the HVAC piping system, probably a pump; this is the second, revised submittal of this checklist.

3.03 STARTUP PLANS AND REPORTS

- A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.
- B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.
- C. Submit directly to the Commissioning Authority.

3.04 PREFUNCTIONAL CHECKLISTS

- A. A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
 - 1. No sampling of identical or near-identical items is allowed.
 - 2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.

3. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
 - a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
 - b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
 - c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
 - d. Serial number of installed unit.
 - e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
 - f. Sensor and actuator calibration information.
- B. Contractor is responsible for filling out Prefunctional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.
 1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
 2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
 3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
 4. If any Checklist line item is not relevant, record reasons on the form.
 5. Contractor may independently perform startup inspections and/or tests, at Contractor's option.
 6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
 7. Submit completed Checklists to Commissioning Authority within two days of completion.
- C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.
 1. Initial Drafts: Contractor is responsible for initial draft of Prefunctional Checklist where so indicated in Contract Documents.
 2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
 3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in Contract Documents or not.
 4. When asked to review the proposed Checklists, do so in a timely manner.
- D. Commissioning Authority Witnessing: Required for:
 1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
 2. A sampling of non-primary equipment, as allowed by the commissioning plan.
- E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
 1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.05 FUNCTIONAL TESTS

- A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.
- B. Contractor is responsible for execution of required Functional Tests, after completion of Prefunctional Checklist and before closeout.
- C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.
- D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.
 - 1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with Contract Documents or does not perform properly.
 - 2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
 - 3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
 - 4. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing.
 - 5. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Prefunctional Checklist correctly; if the test failed for reasons that would not have been identified in the Prefunctional Checklist process, Contractor shall bear the cost of the second and subsequent re-tests.
- E. Functional Test Procedures:
 - 1. Some test procedures are included in Contract Documents; where Functional Test procedures are not included in Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
 - 2. Examples of Functional Testing:
 - a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
 - b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
 - c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.
 - d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.
- F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

3.06 SENSOR AND ACTUATOR CALIBRATION

- A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gauges, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
- B. Calibrate using the methods described below; alternate methods may be used, if approved by Commissioning Authority and Owner beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Prefunctional Checklist or other suitable forms, documenting initial, intermediate and final results.
- C. All Sensors:
 - 1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
 - 2. Verify that sensors with shielded cable are grounded only at one end.
 - 3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2 degree F of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
 - 4. Tolerances for critical applications may be tighter.
- D. Sensors Without Transmitters - Standard Application:
 - 1. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 - 2. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
 - 3. If not, install offset, calibrate or replace sensor.
- E. Sensors With Transmitters - Standard Application.
 - 1. Disconnect sensor.
 - 2. Connect a signal generator in place of sensor.
 - 3. Connect ammeter in series between transmitter and building automation system control panel.
 - 4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
 - 5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
 - 6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
 - 7. Record all values and recalibrate controller as necessary to comply with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
 - 8. Reconnect sensor.
 - 9. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 - 10. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
 - 11. If not, replace sensor and repeat.
 - 12. For pressure sensors, perform a similar process with a suitable signal generator.
- F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
 - 1. Watthour, Voltage, Amperage: 1 percent of design.
 - 2. Pressure, Air, Water, Gas: 3 percent of design.
 - 3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F.
 - 4. Relative Humidity: 4 percent of design.
 - 5. Barometric Pressure: 0.1 inch of Hg.
 - 6. Flow Rate, Air: 10 percent of design.
 - 7. Flow Rate, Water: 4 percent of design.
 - 8. AHU Wet Bulb and Dew Point: 2.0 degrees F.

- G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.
- H. Valve/Damper Stroke Setup and Check:
 - 1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 - 2. Set pump/fan to normal operating mode.
 - 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 - 4. Command valve/damper to open; verify position is full open and adjust output signal as required.
 - 5. Command valve/damper to a few intermediate positions.
 - 6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
- I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
 - 1. With full pressure in the system, command valve closed.
 - 2. Use an ultra-sonic flow meter to detect flow or leakage.

3.07 TEST PROCEDURES - GENERAL

- A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
- B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.
- C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
 - 1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
 - 2. Sampling is not allowed for:
 - a. Major equipment.
 - b. Life-safety-critical equipment.
 - c. Prefunctional Checklist execution.
 - 3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
 - 4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
 - 5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
 - 6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
 - 7. If YY percent of the units in the second sample fail, test all remaining identical units.
 - 8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.
- D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
- E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.

- F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.
- G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.
- H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.
- I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
 - 1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority's request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
 - 2. Other points will be monitored by the Commissioning Authority using dataloggers.
 - 3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.
 - 4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
 - 5. Graphical output is desirable and is required for all output if the system can produce it.
 - 6. Monitoring may be used to augment manual testing.

3.08 OPERATION AND MAINTENANCE MANUALS

- A. See Section 01 7800 - Closeout Submittals for additional requirements.
- B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.
- C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.
- D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

END OF SECTION

SECTION 02 4100 - DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of building elements for alteration purposes.
- B. Salvaged items.
- C. Removed and reinstalled items.

1.02 RELATED REQUIREMENTS

- A. Section 00 3100 - Available Project Information: Existing building survey conducted by Owner; information about known hazardous materials.
- B. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- D. Section 04 2000 - Unit Masonry: Salvaging existing brick.

1.03 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2013.
- B. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings 2011.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.05 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
 - 1. Minimum of 5 years of documented experience.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 SCOPE

- A. Remove portions of existing building as indicated on Drawings including, but not limited to, the following:
 - 1. Remove other items indicated, for salvage and relocation.
 - 2. Unless otherwise indicated, fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Division 31.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with other requirements specified in Section 01 7000.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Prior to start of demolition operations, perform an engineering survey of building condition to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures.
 - 4. Use of explosives is not permitted.
 - 5. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 6. Provide, erect, and maintain temporary barriers and security devices.

7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 8. Do not close or obstruct roadways or sidewalks without permit.
 9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- C. Do not begin removal until receipt of notification to proceed from Owner.
 - D. Do not begin removal until built elements to be salvaged or relocated have been removed.
 - E. Protect existing structures and other elements that are not to be removed.
 1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.
 - F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
 - G. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

3.03 **SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS**

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
 1. Where concrete cannot be cut full depth, cut concrete to a depth of at least 3/4 inch. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
 1. Refer to Section 04 2000 - Unit Masonry for salvaging brick.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI (RWP). Do not use methods requiring solvent-based adhesive strippers.
- E. Roofing: Refer to Section 07 5323 - EPDM Membrane Roofing. Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
 1. Remove existing roof membrane, flashings, copings, and related roof accessories.
 2. Remove existing roofing system down to substrate unless otherwise indicated.

3.04 **EXISTING UTILITIES**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.05 **SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction as specified and/or indicated on Drawings .
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on Drawings.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
 - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - 3. Verify that abandoned services serve only abandoned facilities before removal.
 - 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
 - 4. Patch as specified for patching new work.

3.06 **SALVAGED ITEMS**

- A. Clean salvaged items.
- B. Pack or crate items after cleaning. Identify contents of containers.
- C. Store items in a secure area until delivery to Owner.
- D. Transport items to Owner's storage area on-site.
- E. Protect items from damage during transport and storage.

3.07 **REMOVED AND REINSTALLED ITEMS**

- A. Clean and repair items to functional condition adequate for intended reuse.
- B. Pack or crate items after cleaning and repairing. Identify contents of containers.
- C. Protect items from damage during transport and storage.

- D. 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.

3.08 EXISTING ITEMS TO REMAIN

- A. 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

3.09 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 02 4119 - 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.

1.02 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected pool materials.
 - 2. Salvage of existing items to be reused or recycled.
 - 3. Protection of surrounding areas.
- B. Related Requirements:
 - 1. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 2. Section 13 1100 - Swimming Pool
 - 3. Section 13 1103 - Swimming Pool Tile

1.03 DEFINITIONS

- A. Remove: Detach and remove items from the pool and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Store: Detach and store existing swimming pool items intended for reinstallation and/or reuse (Grab rails, backstroke flags, lifeguard chairs, loose deck equipment, etc.).

1.04 MATERIALS OWNERSHIP

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

1.05 SUBMITTALS

- A. Proposed Protection Measures: Submit plan and report that indicates the measures proposed for protecting individuals and property for dust control and for noise control. Double containment and dedicated exhaust required. Indicate proposed locations and construction of barriers.

1.06 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.07 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owners Representative. Hazardous materials will be removed by the Owners Representative 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 OSHA Standards 29 CFR Part 1926 & 1910.
- C. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that main drains have been plugged and pool inlets have been capped before starting selective demolition operations. All piping and pool equipment to remain fully drained immediately following the draining of the pool until the pool is ready to be refilled and started up for final system commissioning.
- B. Review record documents of existing construction provided by Owners Representative. Owners Representative does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
- F. Notify owner on completion of selective demolition, and obtain documentation verifying that existing surfaces have been inspected and accepted.

3.02 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.
- 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. Contractor to provide a dust control plan for review by the Owner's Representative.
2. Double containment with dedicated exhaust of work area and pathway of removal is required.
3. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
4. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
5. Cover and protect furniture, furnishings, and equipment that have not been removed.
6. Comply with requirements for temporary enclosures and dust control.

3.03 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing pool finishes only to the extent required by new construction and as described and/or indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition of the pool ceramic tile including the tenting or covering of work areas during this process. Comply with guidelines outlined in the Performance Requirements of this specification.
 2. Dispose of demolished items and materials promptly.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them.
1. Protect all finished surfaces during the demolition process.
 2. Do not allow demolished materials to accumulate on-site.
 3. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.05 CLEANING

- A. Clean adjacent structures and improvements including but not limited to structural spaces of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 02 8100- WOOD VEGETABLE PLANTERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Wood Vegetable Planters- At Grade
 - 2. Raised Wood Vegetable Planters
 - 3. Rough and finish carpentry
 - 4. Amended Soil for Vegetable Planting

1.02 DESCRIPTION OF THE WORK

- A. The work under this section consists of furnishing all labor, materials and equipment required to completely execute the wood construction work for this project in place, complete.
- B. The extent of the work is as shown on the drawings and details.

1.03 DEFINITIONS

- A. Acceptance: Wherever the terms "acceptance" or "accepted" are used herein, they mean acceptance of Landscape Architect in writing.

1.04 QUALITY ASSURANCE

- A. Contractor Qualifications: Workmanship shall be best standard practice of trades and shall be performed by workmen skilled in type of work required.
- B. Materials and Work covered under this Section shall be in accordance with Washtenaw County and Township of Scio and Ann Arbor unless otherwise indicated. If a conflict exists between specifications, the more rigorous shall govern.

PART 2 - PRODUCTS

2.01 LUMBER AND HARDWARE

- A. Rough Lumber: All posts shall be No. 2 grade or better, untreated Western Red Cedar, unless otherwise specified on the drawings.
 - 2. The following stresses apply:
 - Posts and dimensional lumber
 - a. Bending $F_b = 700$ psi (rep)
 - b. Shear $F_b = 80$ psi
 - c. Compression $F_c = 475$ psi (perpendicular to grain)
 - d. $E = 1,300,000$ psi
- B. Dressed Lumber: All dimensional lumber shall be No. 2 grade or better, dressed and untreated Western Red Cedar, unless otherwise specified on the drawings.
- C. Hardware:
 - 1. Bolts shall be cadmium plated of size indicated on the drawings complete with nuts and washers. Cadmium plating shall be in accordance with ASTM A165. Bolts shall be of such length that the bolt threads do not protrude further than 1/2" beyond the nut after tightening. Contractor shall notify the Landscape Architect prior to assembly if the length of bolt detailed on the drawings is excessive in this regard.
 - 2. Nails, spikes, and lag screws shall be as listed on the drawings or as appropriate for the work. All nails and spikes shall be hot dipped galvanized in accordance with ASTM A153.
 - 3. Miscellaneous hardware and other fabricated items used in wood-to-wood connections shall be hot dipped galvanized after fabrication in accordance with ASTM A123, minimum 2 oz. per square foot.

2.02 GRADING REQUIREMENTS

- A. Each piece of lumber or plywood delivered to job site shall be properly grade stamped as per the following organizations:
 - 1. Dimensional Lumber - Western Wood Products Association, Southern Pine Inspection Bureau

2.03 PRODUCTS

- A. Raised Wood Vegetable Planters: Raised vegetable planters to be "VegTrug Raised Garden Planter" medium size (available from Eartheasy.com) and all miscellaneous hardware and connections required for assembly.
 - 1. Dimensions: 70" L x 30.7" W x 31.5" H
 - 2. Internal depth of V section is 16.8" (42cm)
 - 3. Weight: 61 lbs
 - 4. Soil Volume: 15 cubic feet (110 gallons)

2.04 COMPOST

- A. Compost shall be used only from City of Ann Arbor, available from WeCare Organics 1.734.477.0334, or approved substitution.

2.05 AMENDED SOIL for VEGETABLE BEDS

- A. Amended soil shall be prepared on site by mixing one (1) part topsoil, one (1) part compost and filling Raised and Wooden Vegetable Planters to 1" below top of planter.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine site and verify that conditions are suitable to receive work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.
- B. Unsuitable conditions: Before proceeding with work, notify Landscape Architect in writing of all unsuitable conditions.

3.02 PREPARATION

- A. Protection:
 - 1. General: Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the work.
 - 2. Barriers: Provide barricades, fences or other barriers as necessary to protect existing conditions to remain from damage during construction.
 - 3. Operations: Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants to remain.
 - 4. Notification of Damages: Submit written notification of all conditions damaged during construction to the Landscape Architect immediately.

3.03 INSTALLATION

- A. Rough and Finish Carpentry and Framing: All wood shall conform to design and details as shown on the drawings with tight joints formed to conceal shrinkage.
 - 1. Complete all rough carpentry and framing in most substantial manner, all as detailed, required, and directed. All shall be well spiked, nailed, screwed and/or bolted together.
 - 2. Provide all hardware and accessories required to properly execute the carpentry work for this project, including, but not limited to: nails, spikes, screws, lag screws, bolts, nuts, washers, and similar items, whether specifically mentioned herein or not.

3. All exterior bolts and lag screws to be countersunk.
4. All accessible bolted connections shall be made with vandal resistant bolts or shall have the nuts set with a punch, cold chisel, epoxy, or other means.
5. Edges of all lumber used for handrails and the like shall be eased.

3.04 FIELD QUALITY CONTROL

Field Observation: Coordinate and schedule with Landscape Architect.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects
InSite Design Studios

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

SECTION 02 8100- WOOD VEGETABLE
PLANTERS
028100-4

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Section 03 3003 "Cast-In-Place Concrete Requirements For Floor Slabs"
 - 2. Section 03 3511 "Concrete Floor Finishes"
 - 3. Section 31 2300 "Excavation and Fill" for drainage fill under slabs-on-ground.
 - 4. Section 32 1300 "Concrete Pavement" for concrete pavement and walks.

1.02 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.03 ACTION SUBMITTALS

- A. Product Data: For each of the following.
 - 1. Portland cement.
 - 2. Fly ash.
 - 3. Slag cement.
 - 4. Blended hydraulic cement.
 - 5. Silica fume.
 - 6. Performance-based hydraulic cement
 - 7. Aggregates.
 - 8. Admixtures.
 - 9. Vapor retarders.
 - 10. Floor and slab treatments.
 - 11. Liquid floor treatments.
 - 12. Curing materials.
 - 13. Repair materials.
 - 14. Joint fillers
- B. Design Mixtures: For each concrete mixture, include the following:
 - 1. Mixture identification.
 - 2. Minimum 28-day compressive strength.
 - 3. Maximum w/cm.
 - 4. Calculated equilibrium unit weight, for lightweight concrete.
 - 5. Slump limit.
 - 6. Air content.
 - 7. Nominal maximum aggregate size.

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

1.04 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Curing compounds.
 - 4. Vapor retarders.
- B. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Portland cement.
 - 2. Fly ash.
 - 3. Slag cement.
- C. Field quality-control reports.

1.05 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
- B. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
 - 1. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- C. Field Quality Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- 1. Comply with ASTM C94/C94M and ACI 301.

1.07 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 - 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 PRODUCTS

2.01 CONCRETE, GENERAL

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

2.02 CONCRETE MATERIALS

- A. Cementitious Materials:
 1. Portland Cement: ASTM C150/C150M.
 2. Fly Ash: ASTM C618, Class C or F.
- B. Normal-Weight Aggregates: ASTM C33/C33M, coarse aggregate or better, graded. Provide aggregates from a single source.
 1. Alkali-Silica Reaction: Comply with one of the following:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
 - c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
 2. Maximum Coarse-Aggregate Size: 1 inch nominal.
 3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C260/C260M.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 2. Retarding Admixture: ASTM C494/C494M, Type B.
 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
 7. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.
- E. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

2.03 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.04 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

2.05 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
- D. Water: Potable or complying with ASTM C1602/C1602M.
- E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.

2.06 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber
- B. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- C. Floor Slab Protective Covering: cellulose fabric.

2.07 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 percent by mass.
 - 3. Silica Fume: 10 percent by mass.
 - 4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
 - 5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

2.08 CONCRETE MIXTURES

- A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.
 - 1. Exposure Class: ACI 318 F1

2. Minimum Compressive Strength: 3500 psi at 28 days.
 3. Maximum w/cm: 0.50
 4. Slump Limit: 5 inches, plus or minus 1 inch
 5. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- B. Class B: Normal-weight concrete used for curbs, piers, exterior concrete.
1. Exposure Class: ACI 318 F3
 2. Minimum Compressive Strength: 5000 psi at 28 days.
 3. Maximum w/cm: 0.40
 4. Slump Limit: 4 inches, plus or minus 1 inch
 5. Air Content:
 - a. 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch nominal maximum aggregate size
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- C. Class C: Normal-weight concrete used for interior slabs-on-ground.
1. Exposure Class: ACI 318 F0.
 2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Maximum w/cm: 0.45
 4. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.

2.09 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94, and furnish batch ticket information.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
 2. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
 1. Daily access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.

4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.03 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.04 INSTALLATION OF VAPOR RETARDER

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

3.05 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.06 CONCRETE PLACEMENT

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

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

3.07 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish:
 - 1. While still plastic, texture concrete surface that has been screeded and bull-floated or dar-bied.
 - 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
 - 3. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish:
 - 1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
 - 2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granu-lar texture and complies with ACI 117 tolerances for conventional concrete.
 - 3. Apply float finish to surfaces to receive trowel finish
- D. Trowel Finish:
 - 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 - 2. Continue troweling passes and restraighten until surface is free of trowel marks and uni-form in texture and appearance.
 - 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 4. Do not add water to concrete surface.
 - 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 - 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, paint, or another thin-film-finish coating system.

7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 2. Coordinate required final finish with Architect before application.
- F. Filling In:
 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- G. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.08 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.
- B. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
 1. Begin curing immediately after finishing concrete.
 2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - (a) Lap edges and ends of absorptive cover not less than 12-inches.
 - (b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - (a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - (b) Cure for not less than seven days.

- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - (a) Water.
 - (b) Continuous water-fog spray.
- b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - (a) Lap edges and ends of absorptive cover not less than 12 inches.
 - (b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - (a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - (b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - (a) Water.
 - (b) Continuous water-fog spray.
- c. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
- d. Floors to Receive Curing and Sealing Compound:
 - 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.09 TOLERANCES

- A. Conform to ACI 117.

3.10 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than 14 days' old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 - 4. Rinse with water; remove excess material until surface is dry.
 - 5. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least **[one] [six]** month(s).
 - 2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 - 1. Repair and patch defective areas when approved by Architect.
 - 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Unformed Surfaces:
 - 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 3. After concrete has cured at least 14 days, correct high areas by grinding.
 - 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.

5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
 6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
 8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
- D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.

3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
 1. Verification of use of required design mixture.
 2. Concrete placement, including conveying and depositing.
 3. Curing procedures and maintenance of curing temperature.
 4. Verification of concrete strength before removal of shores and forms from beams and slabs.
 5. Batch Plant Inspections: On a random basis, as determined by Architect.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of three cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of three laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
9. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
10. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.14 PROTECTION

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

END OF SECTION 033000

SECTION 03 3003 - CAST-IN-PLACE CONCRETE REQUIREMENTS FOR FLOOR SLABS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Underslab vapor retarder.
- B. Concrete mix design requirements for concrete stain and polished finish systems.
- C. Reinforcing and jointing requirements for cast-in-place concrete floor slabs receiving hard tile floor finishes.
- D. Floor flatness and levelness tolerances; slabs on grade and suspended slabs.
- E. Concrete curing requirements for concrete stain and polished finish systems.

1.02 REFERENCE STANDARDS

- A. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017.
- B. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2011 (Reapproved 2017).
- C. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers 2014.
- D. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric) 2014.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of floor slab installation and the work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Mix Design: Submit proposed concrete mix design.
- D. Field Quality Control Reports: Provide the following:
 - 1. F(F) Floor Flatness and F(L) Floor Levelness measurements as specified.
- E. Submit documentation from manufacturers certifying that curing products and methods are compatible with concrete staining and polishing materials and methods.
- F. Manufacturer's Qualification Statement.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Obtain moisture vapor reduction admixture from a single manufacturer.
- B. In addition to requirements of this Section comply with requirements of Section 03 3000 - Cast-in-Place Concrete.
 - 1. If there is a conflict between sections, comply with the more stringent requirement unless otherwise indicated by Architect.
- C. Concrete Curing:
 - 1. Prior to installing and curing concrete floor slabs to be stained and polished, verify with polished concrete materials manufacturer that curing products and methods are compatible with concrete staining and polishing.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- B. Slabs with Moisture Vapor Reduction Admixture (MVRA): Provide warranty to cover the cost of flooring failures due to moisture migration from slabs for ten years.
 - 1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.

PART 2 PRODUCTS

2.01 UNDERSLAB VAPOR RETARDER

- A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
 - 1. Installation: Comply with ASTM E1643.
 - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
 - 3. Minimum Thickness: 15 mil.
 - 4. Products:
 - a. Fortifiber Building Systems Group: www.fortifiber.com.
 - b. Intoplast Group; Barrier-Bac VB-350: www.barrierbac.com.
 - c. ISI Building Products; Viper VaporCheck II 15-mil (Class A): www.isibp.com.
 - d. Poly-America; Husky Yellow Guard 15-mil Vapor Barrier: www.yellowguard.com.
 - e. Stego Industries, LLC; 15 mil: www.stegoindustries.com.
 - f. W. R. Meadows, Inc; PERMINATOR Class A - 10 mils (0.25 mm): www.wrmeadows.com.
 - g. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CONCRETE MIX DESIGN

- A. General: Comply with requirements of Section 03 3000 - Cast-in-Place Concrete and as follows.
- B. Moisture Vapor Reduction Admixture (MVRA):
- C. Concrete mix design requirements for concrete floor slabs to be stained and polished as specified in Section 03 3511 - Concrete Floor Finishes.
 - 1. Aggregates: Uniformly graded mix of not less than 3 aggregate sizes; fine, intermediate and large.
 - 2. Admixtures: Less than 1 to 2 percent of total mix weight.
 - 3. Materials replacing portions of portland cement shall not exceed 10 percent of the portland cement volume and should not be calcium chloride based. Includes, but is not limited to, the following:
 - a. Plasticizers.
 - b. Slag
 - c. Fly ash.
 - 4. Concrete Compressive Strength: 4,000 psi, minimum, at 28 days.
 - 5. Water-to-Cement Ratio: Not to exceed 0.45.

2.03 REINFORCEMENT MATERIALS

- A. Comply with requirements of Section 03 3000 - Cast-in-Place Concrete.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. In addition to requirements of this Section comply with requirements of Section 03 3000 - Cast-in-Place Concrete.

3.02 UNDERSLAB VAPOR RETARDER

- A. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
 - 1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings.

3.03 CONCRETE REQUIREMENTS AT HARD TILE FLOOR FINISHES

- A. Hard tile specified in Section 09 3000 - Hard Tiling shall be installed on concrete floor slabs without control joints and slab jointing.
- B. Unless more stringent requirements are indicated, provide the following minimum requirements at concrete floor slabs where hard tile finishes shall be installed:
 - 1. Concrete Floor Slab Thickness: 5 inches.
 - 2. Reinforcement: No. 4 reinforcing steel (rebars) at 12 inches on center each way.
 - a. Fiber reinforcement is not permitted.
- C. Control Joints and Slab Jointing: None permitted.

3.04 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. General: Unless more stringent requirements are indicated or specified in Section 03 3000 - Cast-in-Place Concrete, comply with floor flatness and levelness values specified in this section.
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
 - 1. Exposed to View and Foot Traffic: F(F) of 25; F(L) of 20, on-grade only.
 - 2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
 - 3. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
 - 4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.
 - 5. Under Wood Gymnasium Floors and Stage Floors: F(F) of 50.
 - a. Verify that concrete subfloor surface is smooth and flat to plus or minus 1/8 inch in 10 feet.
 - 6. Stained and Polished Concrete Floors: F(F) of 50; F(L) of 30, on-grade only.
- C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.05 CONCRETE CURING REQUIREMENTS

- A. At Slabs for Stained and Polished Concrete Floors: Cure with evaporation control and wet curing methods.
 - 1. Chemically reactive curing agents, membrane curing agents, and other topically applied curing compounds are not permitted.

3.06 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 48 hours of test.
- B. Defective Concrete: Concrete not complying with specified requirements.

- C. When test results indicate concrete does not comply with specified requirements, conducts additional tests as directed by Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Repair or replacement of defective concrete will be determined by the Architect.

END OF SECTION

SECTION 03 3511 - CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 SURFACE TREATMENTS FOR CONCRETE FLOORS, SLABS AND OTHER TRAFFIC SURFACES. INCLUDES THE FOLLOWING:

- A. Liquid densifier/hardener.
- B. Concrete stain and polished finish system.

1.03 RELATED REQUIREMENTS

Section 03 3000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

Section 09 6700 - Fluid-Applied Flooring.

1.04 REFERENCE STANDARDS

- A. ASTM D4039 - Standard Test Method for Reflection Haze of High-Gloss Surfaces; 2015.
- B. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method; 2018.
- C. ASTM D5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image (DOI) Gloss of Coated Surfaces; 2018.
- D. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Shop Drawings:
 - 1. Concrete stain and polished finish system: Provide lay-out of concrete stain patterns and designs; indicate locations of each stain color.
- D. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years of documented experience and approved by manufacturer.
- C. Polished Concrete Finishes shall be defined according to the Concrete Polishing Council (CPC), a specialty council of the American Society of Concrete Contractors, as follows:
 - 1. Aggregate Exposure: Denotes the surface exposure after grinding and polishing.
 - a. Class A: Cement Fines.
 - 1) Surface Exposure:
 - (a) Cement Fines: 85 to 95 percent.
 - (b) Fine Aggregates: 5 to 15 percent.
 - b. Class B: Fine Aggregate.
 - 1) Surface Exposure:
 - (a) Fine Aggregates: 85 to 95 percent.
 - (b) Blend of Cement Fines and Coarse Aggregates: 5 to 15 percent.
 - c. Class C: Coarse Aggregate.
 - 1) Surface Exposure:

- (a) Coarse Aggregates: 80 to 90 percent.
 - (b) Blend of Cement Fines and Fine Aggregates: 10 to 20 percent.
2. Polished Concrete Appearance:
- a. Definitions:
 - 1) DOI: Directness-of-Image Gloss; the sharpness of images of objects by reflection at a polished surface, sometimes called image clarity.
 - 2) Image Clarity Value: DOI range from 0 to 100 percent where 100 represents a perfect DOI.
 - (a) Comply with ASTM D5767.
 - 3) Haze Index:
 - (a) Haze is the cloudiness or milky appearance of images or objects produced by reflection in a polished surface.
 - (b) Haze index is obtained from testing per ASTM D4039; calculated from numeric difference between the value of specular gloss at 60 degrees and the value of specular gloss at 20 degrees.
 - b. Level 1: Flat (Ground).
 - 1) DOI: Images of objects being reflected have a flat appearance.
 - 2) Image Clarity Value: 0 to 9
 - 3) Haze Index: Less than 10.
 - c. Level 2: Satin (Honed).
 - 1) DOI: Images of objects being reflected have a matte appearance.
 - 2) Image Clarity Value: 10 to 39
 - 3) Haze Index: Less than 10.
 - d. Level 3: Polished.
 - 1) DOI: Images of objects being reflected do not have a sharp or crisp appearance but can be easily identified.
 - 2) Image Clarity Value: 40 to 69
 - 3) Haze Index: Less than 10.
 - e. Level 4: Highly Polished.
 - 1) DOI: Images of objects being reflected have a sharp and crisp appearance as would be seen in a near-mirror like reflection.
 - 2) Image Clarity Value: 70 to 100.
 - 3) Haze Index: Less than 10.

1.07 **MOCK-UP**

- A. Provide mock-ups of each concrete stain and polished finish; construct mock-ups under conditions similar to those that will exist during installation.
 1. Include example of transition or border between one stain color to another.
- B. Mock-Up Size: 100 feet square.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

1.08 **DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.09 **FIELD CONDITIONS**

- A. Maintain light level equivalent to a minimum 200 W light source at 8 feet above the floor surface over each 20 foot square area of floor being finished.
- B. Maintain ambient temperature of 50 degrees F minimum.

PART 2 PRODUCTS

2.01 **CONCRETE FLOOR FINISH APPLICATIONS**

- A. Concrete sealing stains finish:
 1. As specified in Section 09 9100 - Painting.
- B. Decorative Concrete Stain and Polished finish: CONCD
 1. Use at following locations: As indicated on Drawings.

2.02 DECORATIVE CONCRETE STAIN AND POLISHED FINISH

- A. Decorative Concrete Stain and Polished Finish System:
 - 1. Provide materials, equipment, and procedures designed and furnished by a single manufacturer to produce dense polished concrete of the specified colors and gloss.
- B. Dye/Stain: Penetrating, acetone soluble or dilutable dye.
 - 1. Colors: 1 colors as selected by Architect from manufacturer's full line, unless otherwise indicated.
 - 2. Products:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide indicated products as manufactured by Sika Corp./Scofield; Scofield Formula One Liquid Dye Concentrate: www.scofield.com, or a comparable product by one of the following:
 - 1) Curecrete Distribution Inc.; RetroPlate Concrete Dye Concentrates/Helix Color System: www.retroplatesystem.com.
 - 2) L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc.; Vivid Dye: www.laticrete.com
 - 3) Substitutions: See Section 01 6000 - Product Requirements.
- C. Densifier: Low VOC, lithium silicate or sodium silicate solution, penetrating densifier; increases concrete surface compressive strength and reduces concrete dusting.
 - 1. Products: Basis-of-Design Product: Sika Corp./Scofield; Scofield Formula One Lithium Densifier MP: www.scofield.com.
 - a. Curecrete Distribution Inc.; RetroPlate 99: www.retroplatesystem.com.
 - b. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc.; FGS Hardener Plus: www.laticrete.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- D. Sealer: Low VOC, lithium silicate, silane-siloxane, or fluoropolymer solution, penetrating, non-film forming, and colorless; designed to reduce concrete porosity and resist water penetration and staining; vapor permeable.
 - 1. Products: Basis-of-Design Product: Sika Corp./Scofield; Scofield Formula One Finish Coat: www.scofield.com.
 - a. Curecrete Distribution Inc.; RetroPel: www.retroplatesystem.com.
 - b. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc.; Petrotex: www.laticrete.com.
 - c. Sika Corp./Scofield; Scofield Formula One Finish Coat: www.scofield.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.03 MISCELLANEOUS MATERIALS

- A. For Concrete Stain and Polished Finish:
 - 1. Crack Filler and Saw Joint Filler:
 - a. Colors: Match adjacent concrete color/stain.
 - b. Products:
 - 1) Curecrete Distribution Inc.; CreteFill Pro 85: www.curecrete.com.
 - 2) Metzger/McGuire; SPAL-PRO RS 88: www.metzgermcguire.com.
 - 3) VersaFlex Inc.; VersaFlex SL/85: www.versaflex.com.
 - 2. Grout Material: Mortar used for filling minor voids and spaces in concrete substrates.
 - a. Mortar shall have sufficient bonding capabilities to adhere after polishing to concrete surfaces and provide abrasion resistance equal to or greater than the surrounding concrete substrates.
 - b. Color: To match adjacent concrete.
 - c. Provide one of the following:
 - 1) Silicate binders or latex/acrylic binders mixed with cement dust from previous concrete grinding.
 - 2) Epoxy or polyurethane resins.
 - 3. Temporary Protective Covering:
 - a. Sheet Material: One of the following:

- 1) Multi-ply textured membrane laminated to non-woven polypropylene geotextile; 18 mils thick.
- 2) Cellulose fabric; un-dyed.
- b. Seaming Tape: As recommended by sheet manufacturer.
- c. Materials not permitted:
 - 1) Single ply polyethylene or other plastic sheet materials.
 - 2) Dyed materials.
- d. Products: Includes, but is not limited to, the following:
 - 1) McTech Group, Inc.; EZcover: www.mctechgroup.com.
 - 2) Ram Board Corp.; Ram Board: www.ramboard.com.
 - 3) Sika Corp./Scofield; Proguard Duracover: www.scofield.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that floor surfaces are acceptable to receive the work of this section.

3.02 GENERAL

- A. Apply materials in accordance with manufacturer's instructions.

3.03 LIQUID DENSIFIER/HARDENER

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by liquid densifier/hardener manufacturer according to ASTM D4263 and ASTM F2170.
- C. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.

3.04 CONCRETE STAIN AND POLISHED FINISH

- A. General: Execute using materials, equipment, and procedures specified by manufacturer, using manufacturer approved installer.
- B. Concrete Curing and Protection:
 1. Prior to installing and curing concrete floor slabs to be stained and polished, verify with polished concrete materials manufacturer that curing products and methods are compatible with concrete staining and polishing.
 - a. Proceed with concrete installation and curing only after unsatisfactory conditions have been corrected.
 2. After concrete has cured for 72 hours, cover concrete floors slabs to be stained and polished with a temporary protective covering to prevent concrete from staining and soiling during construction period.
 - a. Install according to protective covering manufacturer's instructions and as follows:
 - 1) Overlap seams at least 3 inches.
 - 2) Tape all seams; do not apply tape directly to concrete.
- C. Examination:
 1. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work
 - a. Concrete must be in place a minimum of 28 days or as directed by the manufacturer before application can begin.
 - b. Verify that concrete requirements of Section 033003 have been met.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Preparation:
 1. Remove temporary protective covering and clean concrete substrates of substances that might impair application and performance of polished concrete floor finishes, including oil, grease, and curing compounds.

- a. Clean according to floor polishing manufacturer's recommendations.
 - b. Clean concrete thoroughly by scraping, applying solvents or stripping agents, sweeping and pressure washing, or scrubbing with a rotary floor machine and detergents recommended by floor polishing manufacturer. Rinse until water is clear and allow surface to dry.
 - 1) Do not use acidic solutions to clean surfaces.
 2. Crack Treatment: Cracks more than 3/32 inch wide shall be routed and filled as follows:
 - a. Route out the cracks to 1/4 inch wide by 1/2 inch deep profile.
 - b. Do not fill cracks and joints until the proper time during the grinding and polishing of the concrete floor.
 - 1) Fill the voids with crack filler material and allow to cure according to the manufacturer's instructions.
 - 2) At all saw joints, install saw cut joint filler at a minimum depth of one inch and allow to cure according to the manufacturer's instructions.
 - 3) Trim the excess material from the slab surface.
 3. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by polishing and staining manufacturer according to ASTM D4263 and ASTM F2170.
- E. Polishing and Staining:
1. General:
 - a. Polish shall be a consistent appearance across entire polished concrete surface.
 - b. Stains shall be a consistent appearance across entire stained concrete surface.
 - 1) Stain concrete in patterns and designs as indicated.
 - c. Polish and stain entire concrete floor slab before equipment, casework, and other fixed items are installed.
 - d. Grind and polish to within 1/2 inch of any vertical surfaces.
 - e. Thoroughly clean floor after each grinding and polishing pass using dust extraction equipment to remove all loose dust and debris.
 - f. Control and dispose of waste products produced by grinding and polishing operations.
 - g. After final polished finish is achieved, neutralize and clean polished floor surfaces.
 2. Final Polished Finish Appearance: As defined by the CPC, polish concrete to meet the following:
 - a. Aggregate Exposure: Class B.
 - b. Appearance Level 2: Satin (Honed).
 3. Polishing and Staining: Apply polished concrete finish system to cured and prepared slabs to match accepted mockup.
 - a. Machine grind floor surfaces to receive polished finishes level and smooth and to depth required to reveal aggregate to match approved mockup.
 - b. Grout grinding: Perform when required to fill surface imperfections and achieve appearance matching approved mock-up.
 - 1) In proper polishing sequence apply grout; using grinding equipment, force grout into the pore structure of the concrete substrate filling surface imperfections.
 - c. Apply penetrating liquid floor treatments for polished concrete in proper polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.
 - 1) Allow concrete surface to dry before applying penetrating liquid floor treatments.
 - 2) Clean concrete thoroughly immediately prior to application.
 - 3) Test surfaces with droplets of water. If water beads and does not penetrate surface, or penetrates only in some areas, profile surfaces by additional grinding, sanding, or abrasive blasting. Retest and continue profiling surface until water droplets immediately darken and uniformly penetrate concrete surfaces.
 - 4) Dyes/Stains:

- (a) Apply stains in patterns and designs indicated.
- (b) Repeat stain applications until colors are consistent with approved mockup.
- 5) Densifiers: Apply 2 coats, minimum.
- 6) Sealers: Apply 2 coats, minimum.
- d. Polish concrete with progressively finer grits until polished appearance matches approved mockup.
- e. Install joint and crack filler in proper polishing sequence and according to manufacturer's written instructions.
- 4. In general, grind and polish floors in the following sequence unless indicated otherwise by product manufacturer's or installer's recommendations.
 - a. Floor Grinding and Polishing.
 - 1) Grind concrete.
 - 2) Grout grinding.
 - 3) Polish concrete.
 - 4) Apply stain.
 - 5) Polish concrete.
 - 6) Apply densifier.
 - 7) Polish concrete.
 - 8) Apply densifier.
 - 9) Polish concrete.
 - 10) Install joint and crack filler.
 - 11) Apply sealer; 2 coats.
 - 12) Polish and burnish concrete to final finish appearance.

3.05 CLEANING AND PROTECTION:

- A. Cleaning:
 - 1. Concrete finishes shall be kept clean and free of debris at all times.
 - 2. Remove spatter from adjoining surfaces, as necessary.
 - 3. Repair damage to surfaces caused by operations.
 - 4. Remove debris from Project site and legally dispose of them.
- B. Protection:
 - 1. Protect concrete finishes and maintain conditions, in a manner acceptable to Installer and manufacturer that ensure concrete floor finish is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 04 2000 - UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete block.
- B. Clay facing brick.
- C. Stone Trim Units
- D. Mortar and grout.
- E. Reinforcement and anchorage.
- F. Flashings.
- G. Lintels.
- H. Accessories.
- I. Products installed under this section:
 - 1. Loose steel lintels in unit masonry; furnished by Section 05 5000 - Metal Fabrications.
 - 2. Manufactured reglets embedded in unit masonry; furnished by Section 07 6200 - Sheet Metal Flashing and Trim.
- J. Products furnished under this section:
 - 1. Structural steel anchor sections for connecting masonry to structural steel; installed by Section 05 1200 - Structural Steel Framing.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.
- B. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- C. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.
- D. Section 07 1113 - Bituminous Dampproofing: Dampproofing parged masonry surfaces.
- E. Section 07 2100 - Thermal Insulation: Insulation for cavity spaces.
- F. Section 07 6200 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- G. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- H. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

- A. ACI 315 - Guide to Presenting Reinforcing Steel Design Details; 2018.
- B. ASTM D1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber 2014.
- C. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications 2012 (Reapproved 2017).
- D. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- F. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2016.
- G. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2016.
- H. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- J. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2016a.
- K. ASTM C91/C91M - Standard Specification for Masonry Cement 2012.

- L. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2011.
- M. ASTM C150/C150M - Standard Specification for Portland Cement 2017.
- N. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2006 (Reapproved 2011).
- O. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale) 2017a.
- P. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2014a.
- Q. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2011.
- R. ASTM C476 - Standard Specification for Grout for Masonry 2019.
- S. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.
- T. ASTM C 1329 - Standard Specification for Mortar Cement - 2016.
- U. ASTM C1405 - Standard Specification for Glazed Brick (Single Fired, Brick Units) 2016.
- V. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry 2016.
- W. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.
- X. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.
- Y. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls 2017.
- Z. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Product Coordination and Limitations: Provide products that when combined with materials and components of other sections, form exterior wall assemblies as detailed on Drawings, that comply with NFPA 285 testing and acceptance criteria.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for masonry.
 - 1. Masonry Units: Indicate sizes, profiles, coursing, and locations of special units.
 - 2. Reinforcing: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars.
 - a. Comply with ACI 315.
 - 3. Flashings: Provide details of embedded flashings including end dams, corners, drips, weeps.
 - 4. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
- D. Samples: Submit 3 samples of facing brick and stone trim units to illustrate color, texture, and extremes of color range.
- E. Test Reports:
 - 1. Concrete masonry manufacturer's test reports for units with integral water repellent admixture.
 - 2. Masonry Veneer Anchors: At wall cavities greater than 4-1/2 inches, provide masonry veneer anchor manufacturer's test reports indicating compliance with TMS 402/602 for lateral load requirements; wall cavity depth includes airspace and cavity wall insulation thickness.
- F. NFPA 285 Documentation: For each product, submit documentation listing compatible materials and components that when used together in wall assemblies as detailed on Drawings, comply with NFPA 285 testing and acceptance criteria.

- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of Contract Documents.
- B. Fire Rated Assemblies: Comply with applicable codes and UL Assembly Numbers indicated.
- C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum 5 years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years of documented experience.

1.07 MOCK-UP

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, wall openings, flashings (with lap joint, corner, and end dam), wall insulation, and stone trim unit in mock-up.
 - 1. Mock-up Panel to include special raked and flush mortar joint treatment for interior CMU walls as specific and as indicated on drawings.
- B. Locate where directed.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS (CMU)

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 - 2. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, control joint edges, angles,, and other detailed conditions.
 - 3. Exposed Outside Block Corners: Provide bullnose, radiused, corners unless otherwise indicated on Drawings.
 - a. Field-ground radiused corners are not permitted.
 - 4. Load-Bearing and Non-Loadbearing Units: ASTM C90, normal weight.
 - a. Standard Units:
 - 1) Exposed Faces: Manufacturer's standard color and texture.
 - 2) Manufacturers:
 - (a) Best Block Company: www.bestblock.net.
 - (b) Consumers Concrete Corp.: www.consumersconcrete.com.
 - (c) Echelon by Oldcastle: www.echelonmasonry.com.
 - (d) Fendt Builder's Supply, Inc.: www.fendtproducts.com.
 - (e) Grand Blanc Cement Products: www.grandblancementproducts.com.
 - (f) Michigan Certified Products, Inc.: www.micertconcrete.com.
 - (g) National Block Company: www.nationalblock.com.
 - (h) Substitutions: See Section 01 6000 - Product Requirements.

2.02 BRICK UNITS

- A. Manufacturers: Provide products from the manufacturer listed for each brick type.
 - 1. Substitutions: Not permitted.
- B. Facing Brick:
 - 1. Special shapes: Provide molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
 - 2. Type A: Field Brick.
 - a. Manufacturer: Taylor Clay Products.

- 1) Substitutions: See section 01 6000 - Product Requirements.
- b. ASTM C216, Type FBX, Grade SW.
- c. Size (Actual): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long (Modular).
- d. Color/Blend: Shade 370.
- e. Texture: Velour.
3. Type B: Accent Brick.
 - a. Manufacturer: Elgin Butler.
 - 1) Substitutions: See section 01 6000 - Product Requirements.
 - b. ASTM C1405, Class SS Type 1 & 2
 - c. Size (Actual): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long (Modular).
 - d. Color/Blend: Shade 2100A.

2.03 STONE TRIM UNITS

- A. Limestone: ASTM C 568/C 568M, Classification II Medium Density.
 1. Variety and Sources: Indiana oolitic limestone quaried in Lawrence, Monroe, or Owen Counties Indiana.
 - a. Grade and Color: Standard, buff, according to grade and color classification established by ILI.

2.04 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M.
- B. Mortar Cement: ASTM C1329.
- C. Portland Cement: ASTM C150/C150M, Type I.
- D. Hydrated Lime: ASTM C207, Type S.
- E. Mortar Aggregate: ASTM C144.
- F. Grout Aggregate: ASTM C404.
- G. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 1. Color(s): As selected by Architect from manufacturer's full range.
 2. Manufacturers:
 - a. Davis Colors: www.daviscolors.com.
 - b. Lambert Corporation: www.lambertusa.com.
 - c. Solomon Colors: www.solomoncolors.com/sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- H. Water: Clean and potable.
- I. Packaged Dry Material for Mortar for Unit Masonry:
 1. At Contractor's option, prepackaged dry material for mortar may be used subject to compliance with mortar requirements of this section including, but not limited to, the following:
 - a. Mortar Types: As indicated.
 - b. Color(s): As selected by Architect from manufacturer's full range.
 - c. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
 2. Portlant Cement Based: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - a. Manufacturers:
 - 1) Amerimix, an Oldcastle brand; www.amerimix.com.
 - 2) The QUIKRETE Companies; www.quikcrete.com.
 - 3) SPEC MIX, Inc.: www.specmix.com.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
 3. Masonry Cement Based: Premixed masonry cement and mason's sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.

- a. Manufacturers:
 - 1) Amerimix, an Oldcastle brand; www.amerimix.com.
 - 2) The QUIKRETE Companies; www.quikrete.com.
 - 3) SPEC MIX, Inc.; www.specmix.com.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
- J. 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. At Contractor's option, prepackaged dry material for grout may be used subject to compliance with grout requirements of this section.
 2. Manufacturers:
 - a. Amerimix, an Oldcastle brand; www.amerimix.com.
 - b. The QUIKRETE Companies; www.quikrete.com.
 - c. SPEC MIX, Inc.; www.specmix.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.05 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 1. Basis-of-Design Product: The design for each item specified is based on the product named. Provide either the named product or a comparable product by one of the following:
 - a. Fero Corp.; www.ferocorp.com.
 - b. Heckmann Building Products; www.heckmannbuildingprods.com.
 - c. Hohmann & Barnard, Inc.; www.h-b.com.
 - d. Wire-Bond; www.wirebond.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; galvanized.
- C. Reinforcing Bar Positioners: 0.156 inch, ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to 16 CFR 1201 Class B.
 1. Basis-of-Design Product: Hohmann & Barnard, Inc.; www.h-b.com: RB and RB-Twin Rebar Positioners.
- D. Reinforcing Bar Lap Joint Ties: ASTM A1064/A1064M steel wire, mill galvanized to 16 CFR 1201 Class 3.
 1. Basis-of-Design Product: Hohmann & Barnard, Inc.; www.h-b.com: Spyra-Lox Rebar Lap-Joint Tie.
- E. Single Wythe Joint Reinforcement: Truss or ladder type; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to 16 CFR 1201 Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
 1. Basis-of-Design Product: Hohmann & Barnard, Inc.; www.h-b.com: 120 Truss-Mesh or 220 Ladder-Mesh.
- F. Adjustable Multiple Wythe Joint Reinforcement: Truss or ladder type with adjustable ties or tabs spaced at 16 in on center ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
 1. Basis-of-Design Product: Hohmann & Barnard, Inc.; www.h-b.com: 170 Truss LOX-ALL Adjustable Eye Wire or 270 Ladder LOX-ALL Adjustable Eye Wire with 2X-HOOK.
- G. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches; hot dip galvanized to ASTM A153/A153M Class B.

1. Basis-of-Design Product: Hohmann & Barnard, Inc.; www.h-b.com: 344 Rigid Partition Anchor.
- H. Partition Top Anchors: 0.1875 inch thick metal plate with a 3/8 inch diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube; hot dip galvanized to ASTM A153/A153M Class B.
 1. Basis-of-Design Product: Hohmann & Barnard, Inc.; www.h-b.com: PTA-420-HS and PTA Tubes.
- I. Adjustable Anchors for Connecting to Structural Steel Framing: 2-piece anchors that permit differential movement between masonry and steel frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
 1. Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
 2. Basis-of-Design Product: Hohmann & Barnard, Inc.; www.h-b.com: 359/359FP anchors with 301W or VBT ties.
- J. Adjustable Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 1. For cold-formed metal framing and sheathing back-up.
 2. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners.
 3. Wire ties: Rectangular shape, 0.1875 inch thick.
 4. Vertical adjustment: Not less than 2 inches.
 5. Basis-of-Design Product: Hohmann & Barnard, Inc.; www.h-b.com: HB-213 anchors with 2X-HOOK.

2.06 FLASHINGS

- A. Flexible Fabric Flashing - Self-Adhering: Self-adhering stainless steel/polymer fabric flashing. ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric. Flashing shall be self-adhering using a pressure-sensitive adhesive.
 1. Type 304 stainless steel.
 - a. Thickness: 2 mils, minimum.
 2. Basis-of-Design Product: Provide York Manufacturing, Inc.; York 304: www.yorkmfg.com, or one of the following products:
 - a. Hohmann & Barnard, Inc.; Mighty-Flash SA: www.h-b.com.
 - b. Wire-Bond; Bond-N-Flash SA: www.wirebond.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Factory-Fabricated Inside and Outside Flashing Corners and End Dams: Stainless steel.
 1. Manufacturer shall be the same as flexible fabric flashing manufacturer.
- C. Factory-Fabricated Drip Plates including Inside and Outside Corners: Stainless steel.
 1. Pre-formed smooth drip plates with hemmed edges.
 2. Manufacturer shall be the same as stainless steel/polymer fabric flashing manufacturer.
- D. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.
 1. Manufacturer shall be the same as flexible fabric flashing manufacturer.

2.07 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints. ASTM D2000, 2AA-805.
 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

- B. Compressible Joint Filler: Closed cell neoprene; oversized 50 percent to joint width; self expanding; in maximum lengths available. ASTM D1056, Grade 2A1.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- C. Cavity Mortar Control/Drainage Material: 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. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.
 - b. Basis-of-Design Product: Provide Hohmann & Barnard, Inc.; www.h-b.com; Mortar Trap or a comparable product by one of the following:
 - 1) Advanced Building Products Inc.; www.advancedbuildingproducts.com.
 - 2) Heckmann Building Products; www.heckmannbuildingprods.com.
 - 3) Mortar Net Solutions; www.mortarnet.com.
 - 4) Wire-Bond; www.wirebond.com.
 - 5) Substitutions: See Section 01 6000 - Product Requirements.
- D. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- E. Termination Bars: Stainless steel, 1/8 inch thick by 1-1/2 inch high with 3/8 inch sealant flange at top; compatible with flashing membrane and adhesives.
 - 1. Manufacturers:
 - a. Advanced Building Products Inc.; www.advancedbuildingproducts.com
 - b. Heckmann Building Products; www.heckmannbuildingprods.com.
 - c. Hohmann & Barnard, Inc.; www.h-b.com.
 - d. Wire-Bond; www.wirebond.com.
 - e. York Manufacturing, Inc.; www.yorkmfg.com
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- F. Weep Inserts and Cavity Vents:
 - 1. Type: Plastic cellular/honeycomb design.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Basis-of-Design Product: Provide Hohmann & Barnard, Inc.; www.h-b.com; QV Quadro-Vent or a comparable product by one of the following:
 - a. Advanced Building Products Inc.; www.advancedbuildingproducts.com.
 - b. Heckmann Building Products; www.heckmannbuildingprods.com.
 - c. Mortar Net Solutions; www.mortarnet.com.
 - d. Wire-Bond; www.wirebond.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- G. Mortar and Grout Screen: 1/4 inch square, polypropylene monofilament screening for preventing grout flow; width sized to match masonry widths.
 - 1. Basis-of-Design Product: Provide Hohmann & Barnard, Inc.; www.h-b.com; MGS or a comparable product by one of the following:
 - a. Heckmann Building Products; www.heckmannbuildingprods.com.
 - b. Wire-Bond; www.wirebond.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- H. Masonry Cleaners:
 - 1. 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.

- a. Basis-of-Design Products: Provide PROSOCO, Inc.; www.prosoco.com: Sure Klean 600 or Sure Klean Vana Trol or a comparable product by one of the following:
 - 1) Diedrich Technologies, Inc.; www.diedrichtechnologies.com.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.

2.08 LINTELS

- A. Masonry Lintels: Masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and weight classification; reinforcing bars as indicated, and filled with grout.
- B. Loose Steel Lintels: Refer to Section 05 5000 - Metal Fabrications.

2.09 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 1. Masonry below grade and in contact with earth: Type M.
 2. Exterior, loadbearing masonry: Type S.
 3. Exterior, non-loadbearing masonry: Type N.
 4. Interior, loadbearing masonry: Type N.
 5. Interior, non-loadbearing masonry: Type N.
 6. Precast concrete units: Same Type as wall masonry in which unit is set.
 7. Limestone units: Same Type as wall masonry in which unit is set.
 8. Pointing Mortar: Type N.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
 1. Grout Strength: 3000 psi at 28 days, unless otherwise indicated.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 SALVAGING BRICK

- A. General: Comply with Section 02 4100 - Demolition.
- B. Where indicated, remove and salvage existing brick.
 1. Carefully remove brick by hand. Cut out full units from joint to joint.
 - a. If required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
 2. Salvage as many whole, undamaged bricks as needed for new construction.
 3. Salvage damaged brick that may be cut and used where cut units are required.
 4. Take care not to chip, crack or otherwise damage surrounding masonry.
- C. Remove mortar, loose particles and soil from salvaged brick by cleaning with hand chisels, brushes and water. Store brick for reuse.
- D. Clean remaining masonry at edges of removal areas by removing mortar, dust, and loose debris in preparation for new construction.
- E. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

3.02 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.

3.03 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

3.04 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

3.05 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. Existing Masonry: Match coursing and bonding of existing masonry unless otherwise indicated.
- D. Concrete Masonry Units: Unless otherwise indicated:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave, except as follows:
 - a. Interior locations as indicated on drawings: vertical joints strike flush, horizontal joints raked.
 - 4. Mortar Joint Thickness: 3/8 inch.
- E. Brick Units: Unless otherwise indicated:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.
 - 4. Mortar Joint Thickness: 3/8 inch.

3.06 PLACING AND BONDING

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Interlock intersections and external corners.
- E. Tooth-in new masonry work with existing, unless otherwise indicated on Drawings.
- F. Tooth-in cutting and patching masonry work unless otherwise indicated on Drawings.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.
- K. Isolate cast stone units and precast architectural concrete units from clay masonry with building paper or similar method of providing a continuous bond break/slip plane.

3.07 WEEPS INSERTS/CAVITY VENTS

- A. Install weep inserts in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 24 inches on center horizontally below shelf angles and lintels and near top of walls.

3.08 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. 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.

3.09 HORIZONTAL JOINT REINFORCEMENT AND ANCHORAGE - 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 on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.10 MASONRY VENEER REINFORCEMENT AND ANCHORAGE

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- C. Embed ties and anchors in mortar joint and extend into masonry veneer unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.11 MASONRY FLASHINGS

- A. General:
 - 1. Install masonry flashings according to manufacturer's instructions and as indicated on the Drawings.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.
 - 4. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - a. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up at least 8 inches, minimum, to form watertight pan at non-masonry construction.
 - 5. Terminate flashing up 8 inches minimum on vertical surface of backing:
 - a. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's direction, unless otherwise indicated.
 - b. Anchor vertical leg of flashing into backing with a termination bar and sealant.
 - 6. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7, unless more stringent requirements are specified in this section.
- B. Flexible Fabric Flashing:
 - 1. Use factory-fabricated drip plates, corners and end dams.
 - 2. Extend flexible fabric flashing to within 1/4 inch of exterior face of masonry overlapping metal drip plate.
 - 3. Extend flexible fabric flashing full width of cavity space and turn up inner masonry wythe or sheathing at least 14 inches.
 - 4. Secure flexible fabric flashing to wall with continuous termination bar and apply sealant across top of termination bar.

3.12 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled.
 - 1. Unless otherwise indicated, reinforce as follows:

- a. Openings to 48 inches: Place two, No. 4 reinforcing bars 1 inch from bottom web.
- b. Openings from 48 inches to 80 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
- c. Openings over 80 inches: Reinforce openings as detailed.
2. Do not splice reinforcing bars.
3. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
4. Place and consolidate grout fill without displacing reinforcing.
5. Allow masonry lintels to attain specified strength before removing temporary supports.
- C. Where the Drawings do not indicate otherwise, provide reinforced unit masonry lintels at all openings and penetrations wider than 12 inches in brick and 24 inches in CMU.
- D. Maintain minimum 8 inch bearing on each side of opening unless otherwise indicated.

3.13 BOND BEAMS

- A. Bond Beams: At bond beams or other locations for horizontally reinforced masonry, provide special masonry units or saw to accommodate reinforcement.
- B. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web unless otherwise indicated.
- C. Lap reinforcing bar splices minimum 24 bar diameters, unless otherwise indicated.
- D. Place and consolidate grout fill without displacing reinforcing.

3.14 VERTICAL MASONRY REINFORCEMENT

- A. Reinforcement: Size and place vertical masonry reinforcement to comply with TMS 402/602 requirements and as indicated on Drawings.
- B. Place and consolidate grout fill without displacing reinforcing.

3.15 GROUTING

- A. Reinforced Hollow Unit Masonry: Keep vertical cores to be grouted clear of mortar, including bed area of first course.
- B. Perform grouting by means of high-lift technique, except in locations that mandate use of low-lift grouting technique.
 1. Do not use high-lift grouting where size of cavities mandates use of fine grout.
- C. Low-Lift Grouting:
 1. Limit height of pours to 12 inches.
 2. Limit height of masonry to 16 inches above each pour.
 3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
 4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
- D. High-Lift Grouting:
 1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
 2. Clean out masonry cells and other cavities to be grouted by high pressure water spray or compressed air. Remove debris, allow to dry, and inspect before sealing cleanout openings.
 3. Hollow Masonry: Limit lifts to maximum 4 feet and pours to maximum height of 24 feet.
 4. Place grout for spanning elements in single, continuous pour.

3.16 GROUTED COMPONENTS

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- B. Place and consolidate grout fill without displacing reinforcing.
- C. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.17 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.
 - 1. Refer to Section 07 9200 - Joint Sealants for sealant installation.

3.18 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, glazed frames, anchor bolts, plates, and reglets 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 12 inches from framed openings.

3.19 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. Location of elements in plan; do not vary from that indicated on Drawings by more than:
 - a. Plus or minus 1/2 inch.
 - 2. Dimensions in cross section; do not vary from that indicated on Drawings by more than:
 - a. Minus 1/4 inch.
 - b. Plus 1/2 inch.
- B. Maximum Variation from Alignment of Columns and Pilasters: 1/4 inch.
- C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- H. Lines and Levels:
 - 1. Maximum variation from level:
 - a. Includes, but is not limited to, the following:
 - 1) Lintels.
 - 2) Sills.
 - 3) Parapets.
 - 4) Reveals.
 - 5) Other conspicuous lines.
 - b. Do not vary from level by more than:
 - 1) 1/4 inch in 20 feet.
 - 2) 1/2 in in 40 feet or more.
 - 2. Maximum variation from plumb:
 - a. Includes, but is not limited to, the following:
 - 1) External corners.
 - 2) Control and expansion joints.
 - 3) Reveals.
 - 4) Other conspicuous lines.
 - b. Do not vary from plumb by more than:
 - 1) 1/4 inch in 20 feet.
 - 2) 1/2 in in 40 feet or more.
- I. Mortar Joint Thickness: Do not vary thickness indicated by more than plus or minus 1/8 inch.

3.20 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

3.21 CLEANING

- A. Protect surrounding elements and finishes from damage due to cleaning procedures.
- B. Appearance Standard: Cleaned surfaces are to have a uniform appearance as viewed from 10 feet away, subject to Architect's approval.
- C. Remove excess mortar and mortar droppings.
- D. Clean soiled surfaces with cleaning solution.
- E. Apply masonry cleaners to masonry surfaces according to manufacturer's written instructions; use brush or spray application.
 - 1. Periodically during rinsing, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.
 - a. Repeat rinsing until tested pH of water runoff is between 6.7 and 7.5.
- F. Clean limestone trim units to comply with stone supplier's written instructions and with recommendations in ILI's "Indiana Limestone Handbook."

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

SECTION 05 4000 - COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Load-bearing formed steel stud exterior wall and interior wall framing.
- B. Exterior wall sheathing.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking and miscellaneous framing.
- B. Section 06 1000 - Rough Carpentry: Roof and wall sheathing.
- C. Section 09 2216 - Non-Structural Metal Framing.
- D. Section 09 5100 - Acoustical Ceilings: Ceiling suspension system.

1.03 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute 2012.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2017.
- D. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases 2017.
- E. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories 2011a (Reapproved 2015).
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015, with Errata (2016).
- G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic") 2002 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, and limitations.
- C. 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 layout.
 - 2. Describe method for securing studs to tracks and for bolted and welded framing connections.
 - 3. Design data:
 - a. Shop drawings signed and sealed by a professional structural engineer.
- D. Designer's Qualification Statement.
- E. Manufacturer's Qualification Statement.

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 the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum 5 years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Framing:
 - 1. ClarkDietrich Building Systems: www.clarkdietrich.com.
 - 2. Jaimes Industries: www.jaimesind.com/#sle.
 - 3. MarinoWARE: www.marinoware.com.
 - 4. MBA Building Supplies, Inc.: www.mbastuds.com.
 - 5. State Building Products; www.statebp.com
 - 6. Steel Stud Solutions, LLC; www.steelstudsolutions.com
 - 7. The Steel Network, Inc: www.SteelNetwork.com.
 - 8. Telling Industries; www.buildstrong.com.
 - 9. Substitutions: See Section 01 6000 - Product Requirements.
- B. Framing Connectors and Accessories:
 - 1. Same manufacturer as metal framing.

2.02 FRAMING SYSTEM

- 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: As indicated on the drawings.
 - 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 1/360 of span.
 - c. Exterior Walls:
 - 1) Maximum horizontal deflection under wind load of 1/720 of span for walls with masonry veneer.
 - 2) Maximum horizontal deflection under wind load of 1/360 of span for all walls without masonry veneer.
 - d. Interior Walls:
 - 1) Maximum horizontal deflection under a horizontal load of 5 psf shall be 1/720 of span for walls with masonry veneer.
 - 2) Maximum horizontal deflection under a horizontal load of 5 psf shall be 1/240 of span for all walls without masonry veneer.
 - e. Design non-axial loadbearing framing to accommodate not less than 1/2 in 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.

2.03 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
 - 1. Depth: As indicated.
 - 2. Gage: Not less than 18 gage, 0.0478 inch.
 - 3. Track Flange Depth: 1-1/2 inch.
 - 4. Stud Flange Depth: 1-5/8" inch.
 - 5. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
- B. Framing Connectors: Factory-made, formed steel sheet.

1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch, and factory punched holes and slots.
 2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
 - a. Where continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
 - b. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
 4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.
 5. Wall Stud Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connections as indicated in the shop drawings.
- C. Slotted Deflection Track: Head-of-wall slotted vertical deflection track.
1. Basis-of-Design Product: ClarkDietrich Building Systems; MaxTrak Slotted Deflection Track: www.clarkdietrich.com.
- D. Fire Stop Slotted Deflection Track: Head-of-wall slotted vertical deflection track with intumescent firestopping strips on each leg.
1. Basis-of-Design Product: ClarkDietrich Building Systems; BlazeFrame Fire Stop Deflection Track: www.clarkdietrich.com.

2.04 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated and Drilled expansion bolts.
- C. Welding: Comply with AWS D1.1/D1.1M.

2.05 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Sill Plate Gaskets: Closed-cell neoprene foam.
 1. Thickness: 1/4 inch.
 2. Width: To match width of bottom track.
- C. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place by welding or with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Install sill plate gaskets continuously under bottom tracks.

- D. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
- E. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- F. Install load bearing studs full length in one piece. Splicing of studs is not permitted.
- G. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- H. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- I. Install intermediate studs above and below openings to align with wall stud spacing.
- J. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- L. Touch-up field welds and damaged galvanized surfaces with primer.

3.03 TOLERANCES

- A. Maximum Variation from True Position: 1/4 inch.
- B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION

SECTION 05 5000 - METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel items, including:
 - 1. Loose steel lintels.
 - 2. Bent metal restraints at top of interior masonry walls.
 - 3. Steel framing supports for the following:
 - a. Roof openings.
 - b. Ceiling-hung toilet compartments.
 - c. Mechanical and electrical equipment.
 - d. Athletic equipment supports hung from or connected to roof steel.
 - e. Applications where framing and supports are not specified in other Sections.
 - f. Other items as indicated on Drawings.
 - 4. Metal ladders .
 - 5. Ship ladders.
 - 6. Bollards.
 - 7. Other items as indicated on Drawings.
- B. Prefabricated metal items, including:
 - 1. Ship ladders.
- C. Slotted channel framing.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete and concrete fill for bollards.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 1200 - Structural Steel Framing: Columns plates and structural steel bearing plates.
- D. Section 05 2100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.
- E. Section 05 3100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- F. Section 09 9100 - Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements 2018.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2014, with Editorial Revision (2017).
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2017.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- J. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.

- K. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2019.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
- M. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015, with Errata (2016).
- N. NAAMM MBG 531 - Metal Bar Grating Manual 2017.
- O. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 1999 (Ed. 2004).
- P. SSPC-SP 2 - Hand Tool Cleaning 2018.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.
- D. Designer's Qualification Statement.
- E. Fabricator's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Design metal fabrications under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M, Grade B, cold-formed or ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black and hot-dip galvanized finish, as indicated.
- E. Slotted Channel Framing:
 - 1. Slotted Channel Framing: ASTM A653/A653M Grade 33.
 - a. Channel Size: 1-5/8 by 1-5/8 inches.
 - b. Thickness: 0.060 inch (16 gage), minimum.
 - c. Finish: Galvanized, G90 coating.
 - 2. Slotted Channel Fittings: ASTM A1011/A1011M.
 - 3. Fittings and Fasteners: Manufacturer's standard fittings and fasteners; finished to match slotted channel framing.
- F. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- G. Bolts, Nuts, and Washers: ASTM A307, Grade A, galvanized to ASTM A153/A153M where connecting galvanized components.
- H. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, galvanized to ASTM A153/A153M where connecting galvanized components.

- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- J. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- K. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- L. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.02 FABRICATION - GENERAL

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 LOOSE STEEL LINTELS

- A. General:
 - 1. Fabricate loose steel lintels from steel angles, plates, and other shapes as indicated.
 - a. Weld adjoining members together to form a single unit.
 - 2. Size loose steel lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches, unless otherwise indicated.
 - 3. Galvanize loose steel lintels located in exterior walls.
 - 4. Prime loose steel lintels located in interior walls.

2.04 BENT METAL RESTRAINTS

- A. Bent Metal Restraints: Bent metal restraints that restrain top of interior masonry walls.
 - 1. Fabricate bent metal restraints from 12 gage, 0.108 inch, thick galvanized sheet steel.
 - a. L-shaped: 4 inches wide; each leg 4 inches long. Minimum.
 - 2. Finish: Prime painted.
 - 3. Fasteners: As appropriate for indicated substrates.

2.05 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
- C. Finish: Prime painted unless otherwise indicated or at an exterior location.
- D. Fabricate support for suspended toilet partitions as follows:
 - 1. Beams: Continuous steel shapes of size required to limit deflection to L/360 between hangers, but use not less than C8x11.5 channels or another shape with equivalent structural properties.
 - 2. Hangers: Steel rods, 1/2 inch in diameter, spaced not more than 36 inches o.c.
 - a. Thread rods to receive anchor and stop nuts.
 - b. Fit hangers with wedge shape washers for full bearing on sloping flanges of support beam.
 - 3. Braces and Angles: Steel angles of size required to rigidly brace and support beams.

- E. Roof Openings: Unless otherwise indicated, provide steel support framing for roof openings as follows:
1. Provide steel support framing around entire perimeter of roof opening; span support framing between primary framing or purlins.
 2. Size steel framing not less than the following for spans indicated:
 - a. Up to 5 feet: C4x5.4 or L4x4x1/4.
 - b. 5 to 7 feet: C5x6.7 or L5x3-1/2x1/4 (LLV).
 - c. 7 to 10 feet: C6x8.2 or L6x3-1/2x5/16 (LLV).
 - d. Refer to Drawings for conditions other than those listed above.
 3. Limit deflection to L/240.

2.06 LADDERS

- A. Ladders: Steel; in compliance with ANSI A14.3, including landings; with mounting brackets and attachments; prime paint finish, except galvanized at exterior locations and elsewhere as indicated.
1. Side Rails: 3/8 x 2 inches members spaced at 18 inches, unless otherwise indicated.
 2. Rungs: 1 inch diameter solid round bar spaced 12 inches on center, unless otherwise indicated. Slip-resistant surface, Grade 2 - Medium.
 - a. Space rungs 7 inches from wall surface, unless otherwise indicated.
 - b. Basis-of-Design Product: Provide SlipNOT, Division of W.S. Molnar Company; SlipNOT Ladder Rung: www.slipnot.com, or a comparable product by one of the following:
 - 1) Brown- Campbell Corp.: www.brown-campbell.com.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
 - c. Where galvanized finish is required, rungs shall be galvanized by rung manufacturer.
 3. Support brackets: At top and bottom of ladder, and not more than 60 inches on center.
 4. Landings and Crossovers: Provide steel bar grating platforms supported by steel angles with railings.
 - a. Grating: NAAMM MBG 531, welded type.
 - 1) Top Surface: Non-slip, Grade 2 - Medium.
 - (a) Basis-of-Design Product: Provide SlipNOT, Division of W.S. Molnar Company; SlipNOT Grip Grate: www.slipnot.com, or a comparable product by one of the following:
 - (1) Substitutions: See Section 01 6000 - Product Requirements.
 - 2) Fabricate to accommodate design loads.
 - 3) Limit openings to no more than 1/2 inch in least dimension.
 - 4) Where galvanized finish is required, grating shall be galvanized by grating manufacturer.

2.07 BOLLARDS

- A. Bollards:
1. Standard Fixed Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish.
 - a. Steel Pipe: Schedule 40 steel pipe.
 - b. Concrete Fill: Refer to Section 03 3000 - Cast-in-Place Concrete.
 2. Surface Mounted Bollards: Steel pipe with minimum 3/8 inch thick steel baseplate welded to bollard base for bolting to concrete slab. Drill baseplates at each corner for 3/4 inch anchor bolts. Galvanized finish.
 - a. Steel Pipe: Schedule 40 steel pipe.
 - b. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.
 3. Covers: High-density polyethylene thermoplastic (HDPE) sleeves with rounded domed top.
 - a. Wall Thickness: 1/4 inch.
 - b. Color: As selected by Architect from manufacturer's standard colors.

- c. Provide complete with manufacturer's standard adhesive tape for securing sleeve to bollard.
- d. Provide covers for all bollards.
- e. Basis-of-Design Product: Provide Ideal Shield; 1/4" Bollard Cover: www.idealshield.com, or a comparable product by one of the following:
 - 1) Substitutions: See Section 01 6000 - Product Requirements.

2.08 PREFABRICATED SHIP LADDERS

- A. Prefabricated Ship Ladders.
- B. Open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.
 1. Treads to be not less than 5 inches (127mm) exclusive of nosing or less than 8-1/2" inches (216 mm) including the nosing.
 2. Riser height to be not more than 9-1/2 inches (241 mm).
 3. Material, including railings: steel.
 4. Treads material: abrasive-surface floor plate.
 - a. Top surface: Non-slip, Grade 2 - medium.
 - 1) Basis-of-Design Product: Subject to compliance with requirements, provide SlipNOT, Division of W.S. Molinar Company, SlipNOT Grip Plate: www.slipnot.com, or a comparable equal product.
 5. Prime interior ships ladders, including brackets and fasteners with primer specified in Section 09 9100 "Painting."
 6. Railings and attachment to building construction design:
 - a. Withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1) Uniform load of 50lbf/ft. (0.73 kN/m) applied in any direction.
 - 2) Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - 3) Uniform and concentrated loads need not be assumed to act concurrently.
 - b. Thermal movements: Allow for thermal movements from ambient and surface temperature changes: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.09 MISCELLANEOUS

- A. Protective Coating: Zinc molybdate alkyd.
- B. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.10 FINISHES - STEEL

- A. Prime paint steel items.
 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items specified for exterior high performance coating painted finish.
 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
 1. Provide at all fabrications except at galvanized locations and where otherwise indicated.
- E. Where indicated, galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
 1. Locations: All exterior locations and elsewhere as indicated.
- F. Where indicated, galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
 1. Locations: All exterior locations and elsewhere as indicated.

2.11 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION - GENERAL

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 BENT METAL RESTRAINTS

- A. Space restraints 24 inches on center at top of masonry walls, staggered each side of wall.
- B. Secure restraints to substrates with appropriate anchors.

3.05 MISCELLANEOUS FRAMING AND SUPPORTS

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

3.06 BOLLARDS

- A. Standard Fixed Bollards:
 - 1. Anchor bollards in place with concrete footings.
 - a. Center and align bollards in holes 3 inches above bottom of excavation.
 - b. Place concrete and vibrate or tamp for consolidation.
 - c. Support and brace bollards in position until concrete has cured.
 - d. Hold top of concrete 8 inches below finish grade, unless otherwise indicated.
 - 2. Fill bollards solidly with concrete, mounding top surface to shed water.
 - 3. Refer to Section 03 3000 "Cast-in-place Concrete" for concrete.
- B. Install sleeve covers according to manufacturer's written instructions.

3.07 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 5213 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel pipe and tube railings.
- B. Stainless steel pipe and tube railings.
- C. Includes:
 - 1. Free-standing railing post and balusters at wood railings.
 - 2. Free-standing railing at pool.

1.02 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures 2006.
- C. ASTM A312/A312M - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes 2019.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2018.
- F. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2016.
- G. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings 2009 (Reapproved 2015).
- H. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.
- I. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings 2013, with Editorial Revision.
- J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015, with Errata (2016).
- L. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 1999 (Ed. 2004).

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of the following:
 - 1. Placement of anchors in concrete and masonry.
 - 2. Placement of backing plates in masonry wall construction.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, material descriptions, finishes, dimensions and details for the following:
 - 1. Gate hardware.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings.
- D. Samples:
 - 1. Railings: Submit 3 samples 12 inches long for each material and finish selected.
 - 2. Miscellaneous: Submit 3 samples, full size, of each elbow, wall bracket, and end stop.
- E. Designer's Qualification Statement.
- F. Fabricator's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
- C. Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
 - 2. A company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Railing Configurations and Layout: As indicated.
- C. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 50 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- D. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- E. Allow for expansion and contraction of members and building movement without damage to connections or members.
- F. Dimensions: See drawings for configurations and heights.
 - 1. Top Rails and Wall Rails: 1-1/2 inches diameter, round, unless otherwise indicated.
 - 2. Intermediate Rails: 1-1/2 inches diameter, round, unless otherwise indicated.
 - 3. Posts: 1-1/2 inches diameter, round, unless otherwise indicated.
 - 4. Balusters: 1/2 inch round solid bar, unless otherwise indicated.
- G. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
- H. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A53/A53M Grade B Schedule 80, black finish.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Exposed Fasteners: No exposed bolts or screws.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
 - 1. Locations: All locations except where galvanizing is required.

2.03 STAINLESS STEEL RAILING SYSTEM

- A. Stainless Steel Tube: ASTM A554, Type 304.
 - 1. Type 316 in natatorium areas.
- B. Stainless Steel Pipe: ASTM A312/A312M, Type 304.

1. Type 316 in natatorium areas.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Exposed Fasteners: No exposed bolts or screws.
- E. Stainless Steel Finish: No. 4 Directional Satin finish

2.04 MISCELLANEOUS MATERIALS

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- B. Anchors and Fasteners: Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
- C. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; minimum 0.015 inch dry film thickness per coat.

2.05 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured.
- D. Welded Joints:
 1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 2. Interior Components: Continuously seal joined pieces by continuous welds.
 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Anchoring Posts in Concrete:
 1. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete.
 2. Insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed in accordance with grout manufacturer's instructions.
 3. Leave anchorage joint exposed with 1/8 inch buildup sloped away from post.
 4. Install removable railing where indicated in slip-fit metal sockets.
 - a. Slip-fit metal sockets shall be either cast in concrete or grouted into core-drilled holes.
 - 1) Grout shall be finished flush with face of concrete.

- F. Weld connections that cannot be shop welded due to size limitations.
 - 1. Weld in accordance with AWS D1.1/D1.1M.
 - 2. Match shop welding and bolting.
 - 3. Clean welds, bolted connections and abraded areas.
 - 4. Touch up shop primer and factory applied finishes.
 - 5. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.
- G. Isolate dissimilar materials with bituminous coating, bushings, grommets or washers to prevent electrolytic corrosion.
- H. Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.05 PROTECTION

- A. Protect installed components and finishes from damage after installation.
- B. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
 - 1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

END OF SECTION

SECTION 06 1000 - ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheathing.
- B. Roofing nailers.
- C. Preservative treated wood materials.
- D. Fire retardant treated wood materials.
- E. Miscellaneous framing and sheathing.
- F. Communications and electrical room mounting boards.
- G. Concealed wood blocking, nailers, and supports.
- H. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Setting anchors in concrete.
- B. Section 05 1200 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.
- C. Section 05 5000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.
- D. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

- A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2015.
- B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2013.
- C. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010 (Reapproved 2017).
- D. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.
- E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.
- F. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies 2017.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- H. AWPA U1 - Use Category System: User Specification for Treated Wood 2017.
- I. PS 1 - Structural Plywood 2009.
- J. PS 20 - American Softwood Lumber Standard 2015.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 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 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.

2.02 DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: Kiln-dry or MC15.
- C. Stud Framing (2 by 2 through 2 by 6):
 - 1. Species: Any allowed under referenced grading rules.
 - 2. Grade: No. 2.
- D. Stud Framing (2 by 6 through 4 by 16):
 - 1. Species: Any allowed under grading rules.
 - 2. Grade: No. 2.
- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: No. 2 Grade.

2.03 CONSTRUCTION PANELS

- A. Wall Sheathing: Plywood, PS 1, Grade C-C
 - 1. Panel Grade: APA Rated; Structural I Sheathing.
 - 2. Span Rating: 48/24.
 - 3. Bond Classification: Exterior.
 - 4. Performance Category: 3/4.
 - 5. Thickness: 3/4 inch unless otherwise indicated.
 - 6. Tongue-and-groove edges.
- B. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 5/8 inch Type X fire resistant.
 - 1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 2. Edges: Square.
 - 3. Products:
 - a. CertainTeed Corp.; GlasRoc Sheathing: www.certainteed.com.
 - b. Continental Building Products; Weather Defense Platinum Sheathing: www.continental-bp.com.
 - c. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gp.com.
 - d. National Gypsum Company; Gold Bond Brand eXP Sheathing: www.nationalgypsum.com.
 - e. United States Gypsum Co.; Securock Brand Glass-Mat Sheathing; www.usg.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- C. Wall Sheathing: Glass mat faced gypsum with integral water-resistive and air barrier, ASTM C1177/C1177M, 5/8 inch thick.
 - 1. Edges: Square.
 - 2. Water Vapor Permeance: 1 perm, minimum, when tested in accordance with ASTM E96/E96M.
 - 3. Air Permeance, Sheathing: 0.001 cfm per square foot, maximum, when tested in accordance with ASTM E2178.
 - 4. Air Permeance, Assembly: 0.04 cfm per square foot, maximum, when tested in accordance with ASTM E2357.

5. Fluid-Applied Flashing: Approved by sheathing manufacturer.
6. Warranty:
 - a. Exposure: Manufacturer's standard; 12 months, against exposure damage, and dated from installation of product.
 - b. Defect: Manufacturer's standard; 5 years, against manufacturing defects, and dated from purchase of product.
 - c. Material: Manufacturer's standard; 5 years, dated from Date of Substantial Completion.
 - d. Effective Drainage Warranty: 12 years, dated from installation of product, when sheathing is used as substrate under approved, water-managed exterior insulation finish system (EIFS).
7. Manufacturers:
 - a. Georgia-Pacific LLC; DensElement Barrier System: www.DensElement.com/#sle.
 - b. Tremco Commercial Sealants & Waterproofing; Securock ExoAir 430 Panel: www.tremcosealants.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- D. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- E. Other Applications:
 1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
 2. Concealed Plywood in Other Locations: PS 1, C-D Plugged or better.

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 1. Metal and Finish: Stainless steel for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
 3. Anchors:
 - a. Toggle bolt type for anchorage to hollow masonry.
 - b. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
 - c. Bolt or ballistic fastener for anchorages to steel

2.05 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.
 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Fire Retardant Treatment:
 1. Manufacturers:
 - a. Lonza Group: www.wolmanizedwood.com.
 - b. Hoover Treated Wood Products, Inc: www.frtw.com.
 - c. Koppers, Inc: www.koppersperformancechemicals.com.
 - d. Viance, LLC: www.treatedwood.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, 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 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.
 - b. Treat lumber in locations as indicated
 3. 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. Preservative Treatment:
1. Manufacturers:
 - a. Lonza Group: www.wolmanizedwood.com.
 - b. Hoover Treated Wood Products, Inc: www.frtw.com.
 - c. Koppers Performance Chemicals, Inc: www.koppersperformancechemicals.com.
 - d. Viance, LLC: www.treatedwood.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
 2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber exposed to weather.
 - c. Treat lumber in contact with roofing, flashing, or waterproofing.
 - 1) At Contractor's option, roof nailers may be non-preservative treated.
 - d. Treat lumber in contact with masonry or concrete.
 - e. Treat lumber less than 18 inches above grade.
 - f. Treat lumber in other locations as indicated.
 3. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - b. Treat plywood in contact with roofing, flashing, or waterproofing.
 - c. Treat plywood in contact with masonry or concrete.
 - d. Treat plywood less than 18 inches above grade.
 - e. Treat plywood in other locations as indicated.
 4. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative.
 5. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.

PART 3 EXECUTION

3.01 PREPARATION

- A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 MISCELLANEOUS FRAMING

- A. Install miscellaneous framing level, plumb, and true to line.
- B. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.
- C. Install horizontal spanning members with crown edge up and not less than 3 inches of bearing at each end.

3.04 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. 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.
- C. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Other locations as indicated.

3.05 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.06 INSTALLATION OF CONSTRUCTION PANELS

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches 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.

3.07 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

3.08 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.09 CLEANING

- A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

ROUGH CARPENTRY
06 1000-6

SECTION 06 1323 - HEAVY TIMBER FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Heavy structural timber for posts, beams, joists, and purlins.
- B. Connection hardware.

1.02 REFERENCE STANDARDS

- A. AITC 108 - Standard For Heavy Timber Construction 1993.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood 2017.
- E. WWPA G-5 - Western Lumber Grading Rules 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate dimensions, wood species and grades, component profiles, drilled holes, fasteners, connectors, erection details and sequence.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings.
- C. Product Data: Submit data on proprietary connection devices.
- D. Product Data: Submit technical data on wood preservative materials, application instructions.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
- F. Designer's Qualification Statement.
- G. Manufacturer's Qualification Statement.

1.04 QUALITY ASSURANCE

- A. Designer Qualifications: Design members under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Lumber Grading Agency: Certified by American Lumber Standards Committee.
- C. Manufacturer Qualifications: Company specializing in manufacture of heavy timber framing, certified by American Institute of Timber Construction, with three years minimum experience.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for loading, seismic zoning, fire retardant criteria, and other governing load criteria.

2.02 WOOD MATERIALS

- A. Wood fabricated from old growth timber is not permitted.
- B. Lumber/Timbers salvaged from deconstruction or demolition of existing buildings or structures is permitted provided it is clean, derailed, and free of paint and finish materials, and other contamination; identify source.
 - 1. Where salvaged wood is used for structural applications, provide wood re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.
- C. Lumber Grading Rules: WWPA G-5.
- D. Lumber: Species; Douglas Fir grade; maximum moisture content of 19 percent.

2.03 FABRICATION

- A. Fabricate components in accordance with AITC 108, with joints neatly fitted, welded, and ground smooth.

2.04 WOOD TREATMENT

- A. Wood Preservative (Pressure Treatment): AWPA U1, Use Category UC4A, Commodity Specification A, using waterborne preservative to 0.25 lb/cu ft retention.
 - 1. Preservative Treatment to be free of Arsenic.
- B. Wood Preservative (Surface Application):
 - 1. Apply to field cut surfaces.

2.05 ACCESSORIES

- A. Fasteners and Anchorages:
 - 1. Provide size and type recommended by applicable standards, complying with applicable State Specifications for nails, staples, screws, bolts, nuts, washers, anchoring devices, straps, connects, and miscellaneous.
- B. Bolts, Nuts, Washers, Lags, and Screws, Untreated Wood: Medium carbon steel; galvanized coating per ASTM A153/A153M; size and type to suit application.

PART 3 EXECUTION

3.01 ERECTION

- A. Set structural members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Do not field cut or alter structural members without approval of Architect.

3.02 SITE APPLIED WOOD TREATMENT

- A. Brush apply one coats of preservative treatment on wood in contact with cementitious materials and roofing and related metal flashings.
- B. Apply preservative treatment in accordance with manufacturer's instructions.
- C. Treat site-sawn ends.
- D. Allow preservative to cure prior to erecting members.

END OF SECTION

SECTION 06 1500 - WOOD DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Softwood lumber structural wood decking.
- B. Preservative treatment of wood.

1.02 REFERENCE STANDARDS

- A. AITC 112 - Standard for Tongue-and-Groove Heavy Timber Roof Decking 1993, with Errata (2003).
- B. WWPA G-5 - Western Lumber Grading Rules 2017.

1.03 SYSTEM DESCRIPTION

- A. Design roof live and dead load: [] psf with deflection limited to 1/240 of span.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials.
- C. Shop Drawings: Indicate deck framing system, loads and cambers, bearing details, and framed openings.
 - 1. Include the design engineer's seal and signature on each sheet of shop drawings.
- D. Samples of Wood Deck Exposed To View: Submit two samples, full width by 24 inch in size illustrating wood grain, stain, and finish.
- E. Designer's Qualification Statement.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with at least three years of documented experience and certified by AITC.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with at least three years of documented experience.

PART 2 PRODUCTS

2.01 WOOD MATERIALS

- A. Wood fabricated from old growth timber is not permitted.
- B. Lumber salvaged from deconstruction or demolition of existing buildings or structures is permitted provided it is clean, dewatered, and free of paint and finish materials, and other contamination; identify source.
 - 1. Where salvaged lumber is used for structural applications, provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.
- C. Wood fabricated from recovered timber (abandoned in transit) is permitted, unless otherwise noted, provided it meets the specified requirements for new wood and is free of contamination; identify source.
- D. Marking: Mark each piece with producer's stamp indicating compliance with specified requirements; for pieces exposed to view in completed construction, submit manufacturer's certificate certifying that products comply with specified requirements in lieu of grade stamping.
- E. Lumber Decking: Fabricated to AITC 112.
 - 1. Species: Douglas Fir, graded under WWPA G-5 rules as AITC Select quality.
 - 2. Size: 2 by 6 inches, nominal.
 - 3. Pattern: AITC standard beveled V-joint with single tongue and groove.

4. Moisture Content: 19 percent, maximum.

2.02 ACCESSORIES

- A. Fasteners and Anchors:
 1. Fastener Type and Finish: Hot-dipped galvanized steel for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 2. Screws: Bugle head, hardened steel, power driven type, length three times thickness of decking.

2.03 WOOD TREATMENT

- A. Factory-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.
- B. Preservative Pressure Treatment:
 1. Preservative Treatment to be free of Arsenic.
 2. Manufacturers:
 - a. Lonza Group; [____]: www.wolmanizedwood.com/#sle.
 - b. Osmose Utilities Services, Inc; [____]: www.osmose.com/#sle.
 - c. Viance, LLC; Ecolife: www.treatedwood.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 3. Preservative Pressure Treatment of Lumber Decking: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
 4. Marking: Mark each piece with stamp of an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- C. Surface-Applied Wood Preservative:

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that support framing is ready to receive decking.

3.02 PREPARATION

- A. Coordinate placement of bearing items.

3.03 SITE APPLIED WOOD TREATMENT

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

3.04 INSTALLATION - BOARD DECKING

- A. Install decking perpendicular to framing members, with ends staggered over firm bearing. On sloped surfaces, lay decking with tongue upward.
- B. Fit butt end deck joints occurring between support members with metal splines to maintain tight, aligned joints.
- C. Engage decking tongue and groove edges.
- D. Secure with fasteners. Side spike planks together, through pre-drilled holes.
- E. Maintain decking joint space of 1/16 inch maximum.

3.05 TOLERANCES

- A. Surface Flatness of Decking Without Load: 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

END OF SECTION

SECTION 06 4023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Standing and running trim.
 - 1. Wood handrail and guardrail cap
- B. Cabinets and millwork - specially fabricated.
 - 1. Plastic-laminate clad cabinets and millwork.
 - 2. Wood cabinets and millwork.
- C. Countertops.
 - 1. Solid surfacing countertops.
 - 2. Countertop support brackets.
- D. Miscellaneous items including:
 - 1. Window stools
 - 2. Translucent Resin Panels
 - 3. Other items as indicated on Drawings.
- E. Architectural Reception Desks
- F. Architectural House Canopies
- G. Shop Finishing of Interior Woodwork

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 09 9123 - Interior Painting: Site finishing of cabinet exterior.
- C. Section 12 3600 - Countertops.
- D. Section 09 7200 - Wallcoverings for Fabric Wallcovering.
- E. Division 26 Section "Interior Lighting" for low-voltage lighting installed in Architectural reception desks and House Canopies.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard 2009.
- B. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use 2016.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).
- E. AWPA U1 - Use Category System: User Specification for Treated Wood 2017.
- F. BHMA A156.18 - American National Standard for Materials and Finishes 2016.
- G. BHMA A156.9 - American National Standard for Cabinet Hardware 2015.
- H. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2016.
- I. ISFA 2-01 - Classification and Standards for Solid Surfacing Material 2013.
- J. MIA (DSDM) - Dimensional Stone Design Manual, Version VIII 2016.
- K. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- L. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2019.
- M. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- N. PS 1 - Structural Plywood 2009.
- O. UL (DIR) - Online Certifications Directory Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data for the following:
 - 1. Anchors and fasteners.
 - 2. Adhesives.
 - 3. Shop finishing materials.
 - 4. Fire retardant treatment.
 - 5. Wood preservative treatment.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories. Include the following:
 - 1. Information required by AWI/AWMAC/WI (AWS).
 - 2. Dimensioned plans, elevations, and sections.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for items installed in architectural woodwork.
- D. Samples: Three samples of each of the following:
 - 1. Plastic Laminates: 12 by 12 inches, for each type, color, pattern, and surface finish.
 - 2. Transparent Wood Finishes:
 - a. Standing and Running Trim: 4 inches by 12 inches for each species, cut, and finish; finish on one side and one edge.
 - b. Door Frames and Borrowed Lite Frames: 4 inches by 12 inches for each species, cut, and finish; finish on one side and one edge.
 - c. Wood Cabinets and Millwork: 12 by 12 inches sample for each species, cut, and finish.
 - 3. Solid Surfacing: 4 by 4 inches, for each type, color, pattern, and finish.
 - 4. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.
 - 5. Wood Veneer Panel Products: 12 by 12 inches sample for each type and finish.
 - 6. Lumber and Panel Products for Field-applied Opaque Finish: 4 inches wide by 12 inches long for lumber and 12 by 12 inches for panels.
 - a. Unfinished.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
- B. Single Source Responsibility: Provide and install interior architectural woodwork from single fabricator.

1.07 MOCK-UP

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Mockups: When requested by Architect, build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Comply with AWI/AWMAC/WI (AWS).
- B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.
- C. Store woodwork in installation areas or in areas with the same environmental conditions; temperature and humidity conditions in storage areas shall be at the same levels planned for occupancy.
- D. Protect units from moisture damage.

1.09 FIELD CONDITIONS

- A. During and after installation of architectural woodwork, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Particle Board: ANSI A208.1, Grade M-2.
- C. Medium Density Fiberboard (MDF): ANSI A208.2, Grade 130.
- D. Hardwood Plywood: HPVA HP-1.
- E. Softwood Plywood: PS 1.
- F. Fire Retardant Treatment:
 - 1. Manufacturers:
 - a. Lonza Group: www.wolmanizedwood.com.
 - b. Hoover Treated Wood Products, Inc: www.frtw.com.
 - c. Koppers, Inc: www.koppersperformancechemicals.com.
 - d. Viance, LLC: www.treatedwood.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. 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.
- G. Preservative Treatment:
 - 1. Manufacturers:
 - a. Lonza Group: www.wolmanizedwood.com.
 - b. Hoover Treated Wood Products, Inc: www.frtw.com.
 - c. Koppers Performance Chemicals, Inc: www.koppersperformancechemicals.com.
 - d. Viance, LLC: www.treatedwood.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber in contact with masonry or concrete.
 - c. Treat lumber in other locations as indicated.
 - 3. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - b. Treat plywood in contact with masonry or concrete.
 - c. Treat plywood at countertop subtops at sinks or other wet locations.
 - d. Treat plywood in other locations as indicated.
 - 4. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative.
 - 5. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.

2.02 LAMINATE MATERIALS

- A. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as indicated or recommended for specific applications.
 - 1. Manufacturers:
 - a. Formica Corporation: www.formica.com.
 - b. Substitutions: Not permitted.

2. Colors, Patterns, and Finishes:
 - a. PL1Formica; Mouse, 928-58.
- B. Low Pressure Decorative Laminate (LPDL): Melamine resin, NEMA LD 3, Type VGL (0.20 inch thick) laminate panels; thermally fused.
 1. Manufacturers:
 - a. Panolam Industries International, Inc.: www.panolam.com.
 - b. Wilsonart: www.wilsonart.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
 2. Color: White unless otherwise indicated.
- C. Edgebanding: Rigid PVC extrusions, flat shaped, smooth texture, through color with satin finish. Width to match component thickness. Match adjacent laminate in color, pattern, and finish.
 1. 0.118 inch (3 mm) thick at doors, drawer fronts, and countertops.
 2. 0.039 inch (1 mm) thick elsewhere, including exposed exterior cabinet members, top edges of drawer boxes, adjustable shelves, and interior panels.

2.03 SOLID SURFACING

- A. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous and non-porous; no surface coating; color and pattern consistent throughout thickness.
 1. Manufacturers:
 - a. E. I. du Pont de Nemours and Company (Dupont); Corian: www.corian.com.
 - b. Substitutions: Not permitted.
 2. Colors, Patterns, and Finishes:
 - a. SS1Rain Cloud.
 - b. SS2Glacier White.
- B. Solid Surfacing Sinks: Undermount oval-shaped sinks integrated at factory with solid-surfacing countertop.
 1. Product:
 - a. E. I. du Pont de Nemours and Company (Dupont); Corian Model 810P Lavatory: www.corian.com.
 - b. Substitutions: Not permitted.
 2. Colors, Patterns, and Finishes: Glacier White.

2.04 TRANSLUCENT RESIN PANELS

- A. [TRP1] Translucent Resin Panels: 3form: www.3-form.com.
 1. Product: Varia Ecoresin
 2. Interlayer: Queue Jest
 3. Color: Skydive (B48)
 4. Diffusion: Powder (D03)
 5. Finish on Front: Sandstone
 6. Finish on Back: Sandstone
 7. Thickness: 1/2"
- B. [TRP2] Translucent Resin Panels: 3form: www.3-form.com.
 1. Product: Varia Ecoresin
 2. Interlayer: none
 3. Color(s):
 - a. Color A: Blue (B36) - Used at Canopy to House 1 (Zone C)
 - b. Color B: Orange (O18) - Used at Canopy to House 2 (Zone F)
 - c. Color C: Purple (V10) - Used at Canopy to House 3 (Zone G)
 - d. Color D: Yellow (Y18) - Used at Canopy to House 4 (Zone K)
 - e. Color E: Green (G33) - Used at Canopy to House 5 (Zone D)
 4. Diffusion: Powder (D03)
 5. Finish on Front: Sandstone

6. Finish on Back: Sandstone
7. Thickness: 1/2"

2.05 ACCESSORIES

- A. Support Faming, Grounds, and Concealed Blocking: Refer to Section 06 1000 - Rough Carpentry.
- B. Stain and Finishing Materials: In compliance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- C. Adhesives: Type recommended by fabricator to suit application.
 1. Do not use adhesives that contain urea formaldehyde.
 2. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: 30 g/L.
 - b. Contact Adhesive: 250 g/L.
- D. Edgebanding: Rigid PVC extrusions, flat shaped, smooth texture, through color with satin finish. Width to match component thickness.
 1. 3 mm thick at doors and drawer fronts and elsewhere as indicated.
 2. 1 mm thick elsewhere, including exposed exterior cabinet members, top edges of drawer boxes, adjustable shelves, and interior panels.
- E. Fasteners: Size and type to suit application.
- F. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- G. Concealed Joint Fasteners: Threaded steel.

2.06 HARDWARE

- A. Cabinet Hardware, General: BHMA A156.9, types as indicated for quality grade specified.
 1. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated. Unless otherwise indicated, provide the following finish:
 - a. Satin Chrome: BHMA 626.
 2. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- B. Hinges: European style concealed type,, with 3 way adjustment, 165 to 170 degree opening, steel with satin finish.
 1. Manufacturers:
 - a. Grass America Inc; Nexis Hinge System: www.grassusa.com.
 - b. Hafele America Co.; Duomatic.165 Concealed Hinge: www.hafele.com
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- C. Hinges: Semic concealed type, Grade 1, 3 knuckle, semi-concealed, institutional hinges, with 3 way adjustment, 270 degree opening, steel with satin finish.
 1. Manufacturers:
 - a. Grass America Inc; Institutional Hinges: www.grassusa.com.
 - b. Hafele America Co.; Aximat 300 Hinge: www.hafele.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- D. Drawer Slides: Zinc-plated, steel ball-bearing slides.
 1. Standard Duty, Grade 1:
 - a. Self-closing, side mounted and extending under bottom edge of drawer.
 - b. Locations: For drawers not more than 3 inches high and 24 inches wide.
 2. Heavy Duty, Grade 1HD-100:
 - a. Self-closing, side or bottom mounted; full-extension type.
 - b. Locations: For drawers not more than 6 inches high and 24 inches wide.

3. Heavy Duty, Grade 1HD-200:
 - a. Self-closing, side or bottom mounted; full-extension type.
 - b. Locations: For drawers more than 6 inches high or 24 inches wide.
4. Manufacturers:
 - a. Accuride International, Inc: www accuride.com.
 - b. Grass America Inc: www grassusa.com.
 - c. Hafele America Co.: www hafele.com.
 - d. Knappe & Vogt Manufacturing Company: www knapeandvogt.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- E. Back-Mounted Pulls:
 1. Product:
 - a. Hafele America Co.; Item No. 117.50.610, Wire Handle, Matt Stainless Steel: www hafele.com.
 - 1) 110mm (4 inches nominal) Width.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- F. Catches: Magnetic catches, BHMA A156.9, B03141.
 1. Available Product:
 - a. Hafele America Co.; Model 246.26.702: www hafele.com.
- G. Door and Drawer Silencers: BHMA A156.16, L03011.
- H. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated shelf rests, satin chrome finish, for nominal 1 inch spacing adjustments.
 1. BHMA A156.9, B04013.
- I. Adjustable Shelf Supports: Standard back-mounted system using surface mounted metal shelf standards and coordinated cantilevered shelf brackets, satin chrome finish, for nominal 1 inch spacing adjustments.
 1. BHMA A156.9, B04102; with shelf brackets, B04112.
- J. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish.
 1. Door Locks: BHMA A156.11, E07121.
 2. Drawer Locks: BHMA A156.11, E07041.
 3. Provide minimum of 2 keys per lock and 4 master keys.
 4. Provide on all drawers and all doors per room or location, unless otherwise indicated.
 - a. Locations: As indicated by Architect.
 5. Key all cabinets within a room the same, key all rooms differently.
- K. Grommets for Cable Passage: 3-inch OD, brass grommets and matching brass caps with slot for wire passage.
 1. Color: Satin Chrome.
 2. Available Product:
 - a. Doug Mockett & Company Inc.; MM Series: www mockett.com.
- L. Coat Rod and Brackets:
 1. Rod:
 - a. Material: Steel Tubing.
 - b. Outside Diameter: 1-5/16 inches.
 - c. Wall Thickness: 0.106 inches.
 - d. Length: As indicated.
 2. Brackets: Wall flanges; steel.
 3. Finish: Chrome.
 4. Available Product:
 - a. Knappe & Vogt; KV 770 Series Rod with 764 Wall Flanges: www knapeandvogt.com.
- M. Countertop Support Brackets:
 1. Tee-Shaped Brackets: Fabricated from 6063-T6 extruded aluminum 2 inch by 3 inch by 3/16 inch Tee.

- a. Finish: Field Painted.
 - b. Size: 18 inch support unless otherwise indicated.
 - 1) Manufacturers:
 - (a) Rakks Model EH 1818 ; Rangine Corp.: www.rakks.com.
 - (b) Or equal by A&M Hardware, Inc.; www.aandmhardware.com.
 - (c) Substitutions: See Section 01 6000 - Product Requirements.
 - c. Where concealed flush mount is indicated on Drawings, provide the following:
 - 1) Manufacturers:
 - (a) Rakks Model EH1818-FM; Rangine Corp.: www.rakks.com.
 - (b) Or equal by A&M Hardware, Inc.; www.aandmhardware.com.
 - (c) Substitutions: See Section 01 6000 - Product Requirements.
- N. Z-Clips: 6063-T6 extruded aluminum z clips. Sized as required to support applied loads.
- 1. Manufacturers:
 - a. Monarch Metal Fabrication: www.monarchmetal.com.
 - b. Eagle Mouldings Inc.: www.eagle-aluminum.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- O. Aluminum Channels and Angles: 6061-T6 extruded aluminum channels, with sharp corners, mill finish, size as required or indicated on Drawings.

2.07 FABRICATION

- A. General:
- 1. Fabricate woodwork to dimensions, profiles, and details indicated.
 - 2. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation.
 - 3. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.
 - a. Locate openings accurately and use templates to produce accurately sized and shaped openings.
 - 4. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
 - 5. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - a. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - b. Cap exposed plastic laminate finish edges with material of same finish and pattern, unless otherwise indicated.
 - 6. Fire Retardant Wood Materials:
 - a. Provide UL (DIR) listed and approved identification on fire retardant treated material.
 - b. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- B. Cabinets and Millwork:
- 1. Assembly: Shop assemble cabinets and millwork for delivery to site in units easily handled and to permit passage through building openings.
 - 2. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Countertops:
- 1. Fabricate tops in one piece, unless size dictates multiple pieces.
 - 2. Solid-Surface Sinks: Provide undermount sinks integrated at factory with solid surface countertops.

2.08 STANDING AND RUNNING TRIM

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. For Transparent Finishes:

1. Wood Species: Select White Maple.
 2. Cut: Plain sawn.
 3. Wood Moisture Content: 5 to 10.
 4. Veneer Grade: AA.
- C. For Opaque Finishes:
1. Wood Species: Any closed-grain hardwood.
 2. Wood Moisture Content: 5 to 10.
- D. Wood Profiles: As indicated on Drawings.

2.09 WOOD CABINETS AND MILLWORK

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Casework Construction Type: Frameless.
- C. Door and Drawer Style: Flush Overlay.
- D. Exposed Surfaces:
1. Wood Species: Select White Maple.
 2. Cut: Plain sawn.
 3. Veneer Grade: AA.
 4. Grain Direction: Vertically for drawer fronts, doors, and fixed panels.
 5. Matching of Veneer Leaves: Book match.
 6. Veneer Matching within Panel Face: Running match.
 7. Matching Between Adjacent Panels: Well matched for color and grain.
- E. Semi-exposed Surfaces:
1. Surfaces Other Than Drawer Bodies: Same species and cut indicated for exposed surface
 2. Drawer Subfronts, Backs, and Sides: Solid-hardwood lumber, same species indicated for exposed surfaces
 3. Drawer Bottoms: Hardwood veneer plywood.
- F. Concealed Surfaces:
1. Manufacturer's choice.
- G. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Drawer Construction Method: Multiple dovetailed.
- H. Cabinet and millwork sizes, layouts, and configurations: As indicated on Drawings.

2.10 PLASTIC LAMINATE CABINETS AND MILLWORK

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Casework Construction Type: Frameless.
- C. Door and Drawer Style: Flush Overlay.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
- E. Exposed Surfaces:
1. Horizontal Surfaces: Grade HGL (0.039 inch thick).
 2. Vertical Surfaces: Grade VGS (0.028 inch thick).
 3. Door and Drawer Edges: PVC edge banding, 0.118 inch (3mm) thick, matching laminate in color, pattern, and finish .
 4. Other Edges: PVC edge banding, 0.039 inch (1mm) thick, matching laminate in color, pattern, and finish
 5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- F. Semi-exposed Surfaces:
1. For semiexposed backs of panels with exposed surfaces: Grade VGS (0.028 inch thick).
 2. Surfaces Other Than Drawer Bodies: Low pressure decorative laminate.

- a. Edges of Low Pressure Decorative Laminate Shelves: PVC edge banding, 0.039 inch (1mm) thick, matching laminate in color, pattern, and finish.
3. Surfaces of Drawer Subfronts, Backs, and Sides: Low pressure decorative laminate.
4. Cores of Drawer Subfronts, Backs, and Sides: Hardwood veneer plywood.
5. Drawer Bottoms: Hardwood veneer plywood.
- G. Concealed Backs of Panels with Exposed or Semi-exposed Surfaces: Grade BKL (0.020 inch thick).
- H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 1. Drawer Construction Method: Multiple dovetailed or doweled.
- I. All cabinets and millwork shall be fabricated with balance construction.
- J. Cabinet and millwork sizes, layouts, and configurations: As indicated on Drawings.

2.11 COUNTERTOPS

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Subtops: plywood.
 1. Thickness: 3/4 inch.
 2. Provide preservative treatment for subtops at sink or other wet locations.
- C. Solid Surface Countertops: Solid surfacing over continuous substrate.
 1. Flat Sheet Thickness: 1/2 inch, minimum.
 2. Substrate: Particle board, medium density fiberboard (MDF), or plywood.
 - a. Thickness: 3/4 inch.
 3. Other Components Thickness: 1/2 inch, minimum.
 4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.
 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
 - a. Field applied.
 6. Fabricate in accordance with manufacturer's standard requirements.

2.12 MISCELLANEOUS ITEMS

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Solid Surface Window Stools: Solid surfacing sheet or plastic resin casting over continuous substrate.
 1. Flat Sheet Thickness: 1/2 inch, minimum.
 2. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge.
- C. Extra Heavy-duty Adjustable Shelf Standards and Supports: Extra Heavy-duty support brackets and C-shaped double-slotted standards. BHMA A156.9
 1. Location:
 - a. Music Storage Room
 2. Wall Standards
 - a. Material: 0.059 inch thick (16 gage) steel channels, double slotted.
 - b. Lengths: As indicated on Drawings.
 3. Support Brackets: Sized for shelves as indicated on Drawings, and as follows:
 - a. Material: 0.059 inch thick (16 gage) steel, minimum.
 - b. 24 inch shelves; 340 lb capacity per pair.
 4. Finish: White powder coat.
 - a. Basis-of-Design Product: Knape & Vogt; 85/185 Series: www.knapeandvogt.com.
 - b. Or equal.
- D. Countertop Support Brackets
 1. Tee-Shaped Brackets: Fabricated from 6063-T6 extruded aluminum 2 inch by 2 inch by 1/4 inch Tee.

- a. Finish: Primed for painting.
- b. Size: Support for 22 inch deep counter unless noted otherwise.
 - 1) Basis-of-Design: Rakks Model EH 1818; Ragine Corp.: www.rakks.com. Or equal product by one of the following:
 - (a) A&M Hardware, Inc.: www.aandmhardware.com
- E. Railings Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

2.13 ARCHITECTURAL RECEPTION DESKS

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Casework Construction Type: Frameless.
- C. Door and Drawer Style: Flush Overlay.
- D. Exposed Surfaces:
 1. Wood Species: Select White Maple.
 2. Cut: Plain sawn.
 3. Veneer Grade: AA.
 4. Grain Direction: Vertically for drawer fronts, doors, and fixed panels.
 5. Matching of Veneer Leaves: Book match.
 6. Veneer Matching within Panel Face: Running match.
 7. Matching Between Adjacent Panels: Well matched for color and grain.
 8. Sequencing within a Room or Space: Blueprint matching.
- E. Semi-exposed Surfaces:
 1. Surfaces Other Than Drawer Bodies: Same species and cut indicated for exposed surface
 2. Drawer Subfronts, Backs, and Sides: Solid-hardwood lumber, same species indicated for exposed surfaces
 3. Drawer Bottoms: Hardwood veneer plywood.
- F. Concealed Surfaces:
 1. Manufacturer's choice.
- G. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 1. Drawer Construction Method: Multiple dovetailed.
- H. Cabinet and millwork sizes, layouts, and configurations: As indicated on Drawings.
- I. Transaction Top and Countertop: Solid-Surfacing Material, in size and profile indicated.
- J. Grommets: Provide grommets in compliance with requirements as prescribed in Article "Hardware, Grommets" above. Provide quantities and locations as indicated on Drawings.
- K. Front Apron: Translucent resin panels, removable, in size and profile indicated. Provide TRP1 as indicated above.
- L. Integrated Lighting: Refer to Division 26 Section "Interior Lighting" for low-voltage lighting.

2.14 ARCHITECTURAL HOUSE CANOPIES

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Exposed Surfaces:
 1. Wood Species: Select White Maple.
 2. Cut: Plain sawn.
 3. Veneer Grade: AA.
 4. Grain Direction: Vertically for drawer fronts, doors, and fixed panels.
 5. Matching of Veneer Leaves: Book match.

6. Veneer Matching within Panel Face: Running match.
 7. Matching Between Adjacent Panels: Well matched for color and grain.
 8. Sequencing within a Room or Space: Blueprint matching.
- C. Concealed Surfaces:
1. Manufacturer's choice.
- D. Millwork sizes, layouts, and configurations: As indicated on Drawings.
- E. Front Apron: Translucent resin panels, removable, in size and profile indicated. Provide TRP2 as indicated above.
- F. Integrated Lighting: Refer to Division 26 Section "Interior Lighting" for low-voltage lighting.

2.15 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Field Applied Opaque Finishes:
1. Apply wood filler in exposed nail and screw indentations and sand smooth.
 2. Shop prime with one coat of wood primer as specified in Section 09 9123 - Interior Painting.
 3. Refer to Section 09 9100 - Painting for field painting.
- C. Shop Applied Transparent Finishes:
1. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
 2. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - a. Transparent Finishes:
 - 1) Provide one of the following finishes:
 - (a) System - 5, Varnish, Conversion.
 - (b) System - 9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
 - (c) System - 10, UV Curable, Water-based.
 - (d) System - 11, Polyurethane, Catalyzed.
 - 2) Stain: To match Architect's samples.
 - 3) Sheen: Satin.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 PREPARATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.
- B. Condition all interior architectural woodwork to temperature and humidity conditions in installation areas for not less than 72 hours prior to installation.
1. Temperature and humidity conditions shall be same levels planned for occupancy.

3.03 INSTALLATION - GENERAL

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Install architectural woodwork level, plumb, true in line, and without distortion.
1. Shim as required with concealed shims.
 2. Install level and plumb to a tolerance of 1/8 inch in 96 inches
- C. Scribe and cut architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

3.04 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints.
1. Use full-length pieces to greatest extent possible.

- B. Do not use pieces less than 96 inches long, except where shorter single-length pieces are necessary.
- C. Scarf running joints and stagger in adjacent and related members.
- D. Secure with countersunk, concealed fasteners and blind nailing.
 - 1. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with architectural woodwork.
 - 2. For shop-finished items, use filler matching finish of items being installed.
- E. Fill gaps between top of base and wall with latex sealant.
 - 1. Refer to Section 07 9200 - Joint Sealants for latex sealant.
 - 2. Paint sealant; refer to Section 09 9123 - Interior Painting.

3.05 **DOOR FRAMES AND BORROWED LITE FRAMES INSTALLATION**

- A. Install door frames and borrowed lite frames level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Countersink fasteners, fill surface flush, and sand smooth
- B. Install fire-rated frames in accordance with NFPA 80 requirements.
- C. Install smoke and draft control door frames in accordance with NFPA 105 requirements.

3.06 **CABINET AND MILLWORK INSTALLATION**

- A. Set and secure custom cabinets and millwork in place, assuring that they are rigid, plumb, and level.
- B. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned.
 - 1. Adjust hardware to center doors and drawers in openings and to provide easy and smooth operation.
- C. Use fixture attachments in concealed locations for wall mounted components.
 - 1. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips, or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets to floor using appropriate angles and anchorages.

3.07 **COUNTERTOP INSTALLATION**

- A. Install countertops level; shim where required.
 - 1. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum.
 - 2. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Attach solid surfacing countertops to substrates with adhesive according to solid surfacing manufacturer's written instructions.
- D. Joints: Keep to a minimum; seal with manufacturer's recommended joint adhesive.
 - 1. Joints shall be inconspicuous in appearance, smooth, and without voids.
 - 2. Use adhesive in color to match countertop; form seams according to manufacturer's written instructions.
- E. Install back and end splashes to countertop and walls with manufacturer's recommended adhesive.
- F. Apply sealant between back and end splashes and wall.
 - 1. Refer to Section 07 9200 - Joint Sealants for joint sealant.

3.08 **ADJUSTING**

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.09 REPAIRING AND CLEANING

- A. Repair damaged and defective architectural woodwork, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural woodwork.
- B. Clean all architectural woodwork, including, but not limited to, casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

SECTION 07 1113 - BITUMINOUS DAMPPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Bituminous dampproofing.
- B. Protection boards.

1.02 RELATED REQUIREMENTS

- A. Section 07 2100 - Thermal Insulation: Rigid insulation board used as protection board.

1.03 REFERENCE STANDARDS

- A. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal 1997 (Reapproved 2011).
- B. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing 2013.
- C. NRCA (WM) - The NRCA Waterproofing Manual 2005.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide properties of primer, bitumen, and mastics.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with at least 5 years of documented experience.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers:
 - 1. BASF Corp., Master Builders Solutions; www.master-builders-solutions.basf.us.
 - 2. Carlisle Coatings and Waterproofing; www.carlisleccw.com.
 - 3. The Euclid Chemical Company; www.euclidchemical.com.
 - 4. Henry Corp.; www.henry.com.
 - 5. Karnak Corp.; www.karnakcorp.com.
 - 6. Lambert Corp.; www.lambertusa.net.
 - 7. W. R. Meadows, Inc.; www.wrmeadows.com.
 - 8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 BITUMINOUS DAMPPROOFING

- A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
 - 1. Composition - Vertical Application: ASTM D1227 Type III or ASTM D1187/D1187M Type I.
 - 2. Composition - Horizontal and Low-Slope Application: ASTM D1227 Type II or III.
 - 3. VOC Content: Not more than permitted by local, State, and federal regulations.
 - 4. Applied Thickness: 1/16 inch, minimum, wet film.
- B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

2.03 ACCESSORIES

- A. Protection Board: 1/8 inch thick bitumen impregnated glass fiberboard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- C. Verify that items penetrating surfaces to receive dampproofing are securely installed.

3.02 PREPARATION

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- D. Apply mastic to seal penetrations, small cracks, or minor honeycombs in substrate.

3.03 APPLICATION

- A. Perform this work in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- B. Prime surfaces in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- C. Prime surfaces at a rate approved by manufacturer for application indicated, and allow primer to dry thoroughly.
- D. Apply bitumen with roller or spray application; apply two coats.
- E. Seal items watertight with mastic, that project through dampproofing surface.
- F. Place protection board directly over dampproofing, butt joints, and adhere to tacky dampproofing.
- G. Scribe and cut boards around projections, penetrations, and interruptions.

END OF SECTION

SECTION 07 2100 - THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation.

1.02 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.
- B. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics 2016.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- D. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Product Coordination and Limitations: Provide products that when combined with materials and components of other sections, form exterior wall assemblies as detailed on Drawings, that comply with NFPA 285 testing and acceptance criteria.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. NFPA 285 Documentation: For each product, submit documentation listing compatible materials and components that when used together in wall assemblies as detailed on Drawings, comply with NFPA 285 testing and acceptance criteria.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than 5 years of documented experience.

1.06 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 BOARD INSULATION MATERIALS

- A. Extruded Polystyrene Board Insulation: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, and the following characteristics:
 - 1. Type: Type IV.
 - 2. Compressive Strength: 25 psi; ASTM D1621.
 - 3. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 4. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 5. R-Value (RSI-value); 1 inch of material at 75 degrees F: 5 (0.88), minimum.
 - 6. Insulation shall be an approved component of an NFPA 285 tested exterior wall assembly as detailed on Drawings; tested in accordance with, and complying with the acceptance criteria, of NFPA 285.
 - 7. Board Edges: Square.
 - 8. Water Absorption, Maximum: 0.3 percent, by volume.
 - 9. Products:
 - a. DiversiFoam Products: CertiFoam 25 SE; www.diversifoam.com.
 - b. Dow Building Solutions, Dow Chemical Company; Styrofoam Brand Square Edge Insulation: www.dow.com.
 - c. Kingspan Insulation LLC; GreenGuard XPS TYPE IV 25 PSI: www.trustgreenguard.com.

- d. Owens Corning; Foamular 250: www.owenscorning.com.
- e. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACCESSORIES

- A. Insulation Fasteners: Impaling clip of unfinished steel with self-locking washer retainer, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
 1. Manufacturers:
 - a. Gemco: www.gemcoinsulation.com.
 - b. AGM Industries, Inc.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Wire Mesh: Galvanized steel, hexagonal wire mesh.
- C. Adhesive: Type recommended by insulation manufacturer for application.
- D. Formed-in-Place Foam Sealant: Two-component polyurethane sealant.
 1. Gun-applied and straw-applied products.
 2. Thermal Resistance (R) Value: 6.5 per inch.
 3. Maximum gap width: 3 inches.
 4. Manufacturer:
 - a. Dow Building Solutions, Dow Chemical Company; Froth-Pak Foam Sealant: www.dow.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

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.
- C. Verify board insulation materials are dry, clean, and ready to receive foam-in-place sealants.

3.02 INSTALLATION - GENERAL

- A. Install according to insulation manufacturers instructions.
- B. Use sizes, thickness, and types as indicated on Drawings.
- C. Fit insulation snugly against abutting insulation and building construction without gaps.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Apply adhesive to back of boards:
 1. Three continuous beads per board length.
- B. Install boards vertically on foundation perimeter, unless otherwise indicated.
 1. Extend boards 24 inches, minimum, below finished floor, unless otherwise indicated.
 2. Place boards to maximize adhesive contact.
 3. Install in running bond pattern.
 4. Butt edges and ends tightly to adjacent boards and to protrusions.
- C. Extend boards over expansion joints, unbonded to foundation on one side of joint.
- D. Formed-in-Place Foam Sealant
 1. Apply formed-in-place foam sealant in accordance with manufacturer's instructions at the following locations:
 - a. Between all board joints.
 - 1) Insert dispensing nozzle between boards and fill with foam sealant until bead of foam is visible at the board surface and continuous along all board joints.
 - b. Between insulation board and abutting adjacent construction.
 - c. Between boards and all penetrating items.
 - d. Foam sealant shall be installed continuously without breaks or gaps.

2. When complete, insulation board installation shall be continuous without air gaps, holes, or open joints and penetrations.
3. Formed-in-place foam sealant is not required at board insulation where foundation perimeter does not have a habitable basement, tunnels, or other open air spaces on the interior side of the foundation perimeter.

3.04 **BOARD INSTALLATION AT WALLS AND PARAPETS**

- A. Apply adhesive to back of boards:
 1. Three continuous beads per board length.
- B. Install rigid insulation directly to steel studs or exterior grade sheathing at 16 inches on center with manufacturer recommended mechanical fasteners, and tape joints with manufacturer's minimum 4 inch wide sealant tape; comply with ASTM E2357.
- C. Install boards horizontally on walls.
 1. Place boards to maximize adhesive contact.
 2. Install in running bond pattern.
 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- D. Extend boards over expansion joints, unbonded to wall on one side of joint.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- F. Apply formed-in-place foam sealant in accordance with manufacturer's instructions at the following locations:
 1. Between all board joints.
 - a. Insert dispensing nozzle between boards and fill with foam sealant until bead of foam is visible at the board surface and continuous along all board joints.
 2. Between insulation board and abutting adjacent construction.
 3. Between boards and all penetrating items.
 4. Foam sealant shall be installed continuously without breaks or gaps.
- G. When complete, insulation board installation shall be continuous without air gaps, holes, or open joints and penetrations.
- H. Tape insulation board joints.
- I. Soffits and overhead insulation installation is similar.

3.05 **BOARD INSTALLATION UNDER CONCRETE SLABS**

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Butt edges and ends tightly to adjacent boards; taping and foam-in-place sealant is not required.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- D. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.06 **INSULATION AT MISCELLANEOUS VOIDS**

- A. Install one or more of the following:
 1. Mineral fiber batt insulation.
 2. Formed-in-place foam sealant.
- B. Install insulation to neatly fit spaces; fill voids completely without compressing insulation.

3.07 **PROTECTION**

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

END OF SECTION

TMP Architecture, Inc.
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TMP19040
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SECTION 07 2119 - FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Foamed-in-place insulation.
 - 1. Insulation shall act as an air barrier and vapor retarder.
 - 2. In masonry cavity walls.

1.02 REFERENCE STANDARDS

- A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2019.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- C. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings 2014.
- D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.
- E. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics 2016.
- F. ASTM D1622/D1622M - Standard Test Method for Apparent Density of Rigid Cellular Plastics 2014.
- G. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016.
- H. ASTM D6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics 2015.
- I. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a, with Editorial Revision (2013).
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- K. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- L. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.
- M. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
- N. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.
- O. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.
- B. Product Coordination and Limitations: Provide products that when combined with materials and components of other sections, form exterior wall assemblies as detailed on Drawings, that comply with NFPA 285 testing and acceptance criteria.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.
- C. Shop Drawings: Show materials and details.
 - 1. Include:
 - a. Transition and flashing details.
- D. Submit documentation from manufacturers certifying compatibility of insulation, transition membranes and flashings, and overcoats.

- E. Qualifications: For manufacturer and applicator.
- F. Field Quality Control: Submit field inspection reports.
- G. NFPA 285 Documentation: For each product, submit documentation listing compatible materials and components that when used together in wall assemblies as detailed on Drawings, comply with NFPA 285 testing and acceptance criteria.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than 5 years of documented experience.
- B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum 5 years of documented experience.
 - 1. Applicator shall be approved or certified by the insulation manufacturer.

1.06 MOCK-UP

- A. Construct mock-up, 4 feet long by 8 feet wide; include insulation overcoat, wall construction, and typical transition and flashing details at openings such as windows and doors.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.07 FIELD CONDITIONS

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
- B. Do not apply foam when temperature is within 5 degrees F of dew point.
- C. Do not install foamed-in-place insulation during precipitation or when precipitation is imminent.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, open or closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
 - 1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and overcoat limitations.
 - a. Insulation shall be an approved component of an NFPA 285 tested exterior wall assembly as detailed on Drawings; tested in accordance with and complying with the acceptance criteria of NFPA 285.
 - 2. Properties:
 - a. Core Density: 2.0 pcf, minimum; ASTM D1622/D1622M.
 - b. Closed Cell Content: Greater than 90 percent; ASTM D6226.
 - c. Thermal Resistance: 6.8 R, minimum, per inch; ASTM C518.
 - d. Compressive Strength: 27 psi, minimum; ASTM D1621.
 - e. Moisture Vapor Transmission: 1.3 perm at 1 inch, maximum; ASTM E96/E96M.
 - f. Air Permeance: 0.004 cfm per sq ft, maximum; ASTM E2178.
 - g. Surface Burning Characteristics: ASTM E84.
 - 1) Flame Spread Index: Less than or equal to 25 at 4 inches.
 - 2) Smoke Developed Index: Less than or equal to 450 at 4 inches.
 - h. Fungal Resistance: Negligible or No Growth; ASTM C1338 or ASTM G21.
 - 3. Products:
 - a. BASF Corp.; Walltite US Series: www.spf.basf.com.
 - b. Demilec, Inc.; Heatlok HFO Pro: www.demilec.com.
 - c. Henry Company; Permax 2.0X: www.henry.com.
 - d. Icynene Inc.; ProSeal: www.icynene.com.
 - e. Johns Manville; JM Corbond III: www.jm.com.
 - f. NCFI Polyurethanes; InsulBloc Spray Foam System (11-017): www.ncfi.com.
 - g. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACCESSORIES

- A. Primer: As required by insulation manufacturer and accessory manufacturers.
- B. Transitions and Flashings:
 - 1. General:
 - a. Products shall be compatible with foamed-in-place insulation and approved by foamed-in-place insulation manufacturer.
 - b. Maintain the continuity of the air and water barrier as it transitions to adjacent materials.
 - c. Materials shall be compatible with adjacent materials.
 - d. Transitions and flashings shall be an approved component of an NFPA 285 tested exterior wall assembly as detailed on Drawings; tested in accordance with, and complying with the acceptance criteria of NFPA 285.
 - 2. Liquid-Applied Flashings and Sealants:
 - a. Non-asphaltic product: one part, fast curing, non-sag, elastomeric, gun grade, trowelable liquid flashing.
 - b. Available products include, but are not limited to, the following:
 - 1) The Dow Chemical Company; Dowsil 758 Silicone Weather Barrier Sealant: www.dow.com.
 - 2) Momentive Performance Materials, Inc./GE; Elemax 5000 Liquid Flashing: www.siliconeforbuilding.com.
 - 3) Prosoco Inc.; R-Guard FastFlash: www.prosoco.com.
 - 4) Tremco, Inc.; Spectrem 1: www.tremcosealants.com.
 - 3. Silicone Sheet Transitions:
 - a. Pre-cured silicone rubber sheets and pre-molded corners.
 - b. Install using liquid-applied flashings and sealants as an adhesive.
 - c. Available products include, but are not limited to, the following:
 - 1) The Dow Chemical Company; Dowsil Silicone Transition Strip: www.dow.com.
 - 2) Momentive Performance Materials, Inc./GE; UltraSpan UST/USM Pre-Cured Silicone Transition Sheet and Molded Corners: www.siliconeforbuilding.com.
 - 3) Prosoco Inc.; R-Guard SureSpan EX: www.prosoco.com.
 - 4) Tremco, Inc.; ProGlaze ETA and Spectrem Simple Seal: www.tremcosealants.com.
 - 4. Rubberized Asphalt Sheet
 - a. Self-adhering SBS rubberized asphalt sheet with polyethylene film top surface and a release liner; 40 mil total thickness.
 - 1) Properties:
 - (a) Water Vapor Permeance: Maximum 0.1 perms; ASTM E96/E96M, Method B.
 - (b) Air Permeance: Maximum 0.0002 cfm per sq ft at 75 Pa; ASTM E2178.
 - (c) Puncture Resistance: Minimum 40 lbf; ASTM E154/E154M.
 - (d) Elongation: Minimum 200 percent; ASTM D412.
 - 2) Available products include, but are not limited to, the following:
 - (a) Carlisle; CCW-705 XLT Air & Vapor Barrier; www.carlisleccw.com.
 - (b) GCP Applied Technologies; Perm-A-Barrier Detail Membrane; www.gcpat.com.
 - (c) Henry Company; Blueskin SA: www.henry.com.
 - (d) Tremco; ExoAir 110: www.tremcosealants.com.
 - (e) W. R. Meadows, Inc.; Air-Shield: www.wrmeadows.com.
 - 5. Flexible Fabric Flashing - Self-Adhering: Self-adhering stainless steel/polymer fabric flashing. ASTM A240/A240M stainless steel sheet bonded with rubber-based adhesive to one sheet of polymer fabric. Flashing shall be self-adhering using a pressure-sensitive adhesive.
 - a. Type 304 stainless steel.
 - 1) Thickness: 2 mils, minimum.

- b. Available products include, but are not limited to, the following:
 - 1) York Manufacturing, Inc.; York 304: www.yorkmfg.com.
 - 2) Hohmann & Barnard, Inc.; Mighty-Flash SA: www.h-b.com.
 - 3) Momentive Performance Materials, Inc./GE; GE Elemax SS Flashing: www.siliconeforbuilding.com.
- 6. Flexible Fabric Flashing: Stainless steel/polymer fabric flashing. ASTM A240/A240M stainless steel sheet bonded with rubber-based adhesive to one sheet of polymer fabric.
 - a. Type 304 stainless steel.
 - 1) Thickness: 2 mils, minimum.
 - b. Available products include, but are not limited to, the following:
 - 1) York Manufacturing, Inc.; Multi-Flash SS: www.yorkmfg.com:
 - 2) Hohmann & Barnard, Inc.; Mighty Flash: www.h-b.com.
 - 3) Prosoco Inc.; R-Guard SS ThruWall: www.prosoco.com.
- 7. Metal Flashings:
 - a. Stainless-steel sheet: ASTM A666 or ASTM A240/A240M, Type 304, 0.025 inch (24 gage) thick, minimum; smooth 2D (dull cold-rolled) finish..
 - 1) Fasteners: Stainless steel.
 - b. Comply with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

3.02 PREPARATION

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Install transitions and flashings around corners of openings, around penetrations, and elsewhere as recommended by foamed-in-place insulation manufacturer and as indicated on Drawings.
- C. Coordinate detailing of transitions to other air barrier materials in order to maintain a continuous air barrier.
 - 1. Ensure that transition materials are compatible with adjacent air barrier materials.
 - 2. Notify Architect of any issues prior to installing foamed-in-place insulation. Do not proceed with foamed-in-place insulation installation until issues have been resolved and approved by Architect.
- D. At deflection, expansion, and control joints, provide accommodations to allow for anticipated movement as acceptable to foamed-in-place insulation manufacturer.
- E. At static gaps more than one inch wide make accommodations to allow foamed-in-place insulation to bridge gap.
 - 1. Mechanically fasten continuous metal flashing across gap to support insulation.
- F. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

- A. Apply insulation in accordance with manufacturer's instructions.
 - 1. Apply insulation in consecutive passes as recommended by manufacturer to achieve overall thickness and required R-Values.
 - a. Spray in multiple passes and allow each pass to fully cool before applying subsequent passes in order to prevent excessive overheating of foamed-in-place insulation and possible damage to transition membranes and flashings.
- B. Apply insulation by spray method, to a uniform monolithic density without voids.
 - 1. Finished surface of foamed-in-place insulation to be free of voids and fully sealed around embedded penetrating objects.

2. Where applied in voids and gaps assure space for foam expansion to avoid pressure on adjacent materials that may bind operable parts, push out the adjacent material, or otherwise cause damage to the materials.
3. Neatly trim and remove excess insulation that would interfere with the installation of adjacent construction.
 - a. In wall cavities ensure that indicated air spaces remain clear of insulation.

3.04 TOLERANCES

- A. Insulation Thickness: Maximum variation as follows:
 1. No more than 1/4 inch less than required thickness.
 2. No more than 1/2 inch greater than required thickness.

3.05 FIELD QUALITY CONTROL

- A. Field inspections and tests will be performed by an independent testing agency under provisions of Section 01 4000 - Quality Requirements.
- B. Inspection: Inspection will include the following:
 1. Verification of insulation thickness and density.
 2. Verification that finished surface of foamed-in-place insulation is free of voids and continuous.
 3. Verification that insulation seals tightly around penetrations and against adjacent materials without any gaps.
 4. Verification that transitions and flashing details are installed properly; do not cover until inspections are complete.
- C. Do not cover installed insulation until inspections have been completed.
- D. Deficiencies shall be corrected by the Contractor at no additional cost to the Owner.

3.06 PROTECTION

- A. Do not permit subsequent construction work to disturb applied insulation.
- B. If damage occurs, patch damaged areas in accordance with foamed-in-place manufacturer's instructions.

END OF SECTION

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SECTION 07 2423 - DIRECT-APPLIED FINISH SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Direct-Applied Finish System (DAFS) for exterior and interior soffits and ceilings.

1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Sheathing on metal studs.
- B. Section 07 9200 - Joint Sealants: Sealing joints between DAFS and adjacent construction and penetrations through DAFS.

1.03 ABBREVIATIONS

- A. DAFS: Direct-Applied Finish Systems.

1.04 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- C. ASTM C150/C150M - Standard Specification for Portland Cement 2020.
- D. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive 2017.
- E. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity 2015.
- F. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- H. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- I. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials 2013.
- J. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials 2013.
- K. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems 2009, with Editorial Revision (2014).
- L. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies 2009, with Editorial Revision (2012).

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.
- C. Shop Drawings: Indicate plans, details, joint patterns, joint details, and molding profiles.
- D. Verification Samples: Submit three actual samples of selected coating on specified substrate, minimum 12 inches square, illustrating project colors and textures.
- E. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

1.06 QUALITY ASSURANCE

- A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site during installation.

- B. Manufacturer Qualifications: Provide DAFS products from manufacturer with qualifications as follows:
 - 1. Member in good standing of EIMA (EIFS Industry Members Association).
 - 2. Manufacturer of DAFS products for not less than 5 years.
- C. Installer Qualifications: Company specializing in the type of work specified and with at least 5 years of documented experience and approved by manufacturer.

1.07 **MOCK-UP**

- A. Construct mock-up of typical DAFS application on specified substrate, size as required to include examples of all key conditions, and including flashings, joints, and edge conditions.
- B. Locate mock-up where directed.
- C. Mock-up may remain as part of the Work.

1.08 **DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.
- B. Storage: Store materials as directed by manufacturer's written instructions.
 - 1. Protect adhesives and finish materials from freezing, temperatures below 40 degrees F and temperatures in excess of 90 degrees F.
 - 2. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.

1.09 **FIELD CONDITIONS**

- A. Do not prepare or install materials in conditions other than those described in the manufacturer's written instructions.
- B. Do not prepare or apply materials during inclement weather unless areas of installation are protected. Protect installed direct-applied finish system areas from inclement weather until dry.
- C. Do not install coatings or sealants when ambient temperature is below 40 degrees F.

1.10 **WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

- A. Products:
 - 1. BASF Corp.; Synergy Direct Finish Systems for Soffits and Ceilings: www.basf.com.
 - 2. Dryvit Systems, Inc.; Direct Applied TAFs: www.dryvit.com.
 - 3. Parex USA, Inc.; ACF Soffit: www.parex.com.
 - 4. Sto Corp.; Or Equal: www.stocorp.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 **DIRECT-APPLIED FINISH SYSTEM**

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, when tested in accordance with ASTM E84.
- B. Adhesion of Water-Resistive Coating to Substrate: For each combination of coating and substrate, minimum ensile bond strength of 15 psi, when tested in accordance with ASTM E2134 .
- C. Water Penetration Resistance: No water penetration beyond the plane of the base coat after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf differential pressure.
- D. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B117, using at least three samples matching intended assembly, at least 4 by 6 inches in size.

- E. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with {rs\#1} or 16 CFR 1201.
- F. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycles 1, 5, or 9.
- G. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.
- H. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.
- I. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 113.5 gallons of sand.

2.03 MATERIALS

- A. Finish Coating Top Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.
 - 1. Texture: Sand/Fine.
 - 2. Color: As selected by Architect from manufacturer's full range.
- B. Base Coat: Acrylic- or polymer-modified, fiber reinforced Portland cement coating; compatible with substrate board and reinforcing mesh.
 - 1. Portland Cement: ASTM C150/C150M, Type I or II.
- C. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating; weight, strength, and number of layers as required by base coat manufacturer.
- D. Substrate Board: Refer to Section 06 1000 - Rough Carpentry.

2.04 ACCESSORY MATERIALS

- A. Primer: Primer as recommended by DAFS manufacturer for substrate and project conditions.
- B. Trim: DAFS manufacturer's standard PVC trim accessories, as required for a complete project.
- C. Sealant Materials: Compatible with DAFS materials and as recommended by DAFS manufacturer.
- D. Exterior Soffit Vents: One piece, perforated, ASTM B221 AA DAF-45 6063 alloy, T5 temper, aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with DAFS installation and is of a type and construction that is acceptable to DAFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.
- B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

3.02 PREPARATION

- A. Apply primer to substrate as recommended by DAFS manufacturer for project conditions.

3.03 INSTALLATION

- A. Install in accordance with DAFS manufacturer's instructions.
- B. Substrate Boards: Refer to Section 06 1000 - Rough Carpentry.

- C. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at terminations of DAFS. Install reinforcing fabric as recommended by DAFS manufacturer.
 - 1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches.
 - 2. Allow base coat to dry a minimum of 24 hours before next coating application.
- D. Apply finish coat after base coat has dried not less than 24 hours and finish to a uniform texture and color.
- E. Finish Coat Thickness: As recommended by manufacturer.
- F. Seal control and expansion joints within the field of exterior finish and insulation system, using procedures recommended by sealant and finish system manufacturers.

3.04 **CLEANING**

- A. Clean DAFS surfaces and work areas of foreign materials resulting from DAFS operations.

3.05 **PROTECTION**

- A. Protect completed work from damage and soiling by subsequent work.

END OF SECTION

SECTION 07 2726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vapor-retarding, fluid-applied air barriers.

1.02 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$.
 - a. Vapor Barrier: Has water vapor permeance of 0.1 perms maximum.
 - b. Vapor Permeable: Has water vapor permeance of 1 perms or greater.
- D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

1.03 REFERENCE STANDARDS

- A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2019.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- C. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2019.
- D. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016.
- E. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method 1983 (Reapproved 2018).
- F. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers 2017.
- G. ASTM E1186 - Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems 2017.
- H. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.
- I. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies 2018.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- K. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- L. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.
- M. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.
- B. Product Coordination and Limitations: Provide products that when combined with materials and components of other sections, form exterior wall assemblies as detailed on Drawings, that comply with NFPA 285 testing and acceptance criteria.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description and data on material characteristics, performance criteria, and limitations.
- C. Shop Drawings: For air barrier assemblies.
 - 1. Show locations and extent of air barrier materials, accessories, and assemblies specific to Project conditions.
 - 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 3. Include details of interfaces with other materials that form part of air barrier.
- D. 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.
- E. Qualifications: For manufacturer and applicator.
- F. Field Quality Control: Submit field inspection reports.
- G. NFPA 285 Documentation: For each product, submit documentation listing compatible materials and components that when used together in wall assemblies as detailed on Drawings, comply with NFPA 285 testing and acceptance criteria.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than 5 years of documented experience.
- B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum 5 years of documented experience and as follows:
 - 1. Applicator shall be approved or certified by the air barrier manufacturer.
 - 2. Applicator shall be an accredited installer under the Air Barrier Association of America's (ABAA) Quality Assurance Program.

1.07 MOCK-UP

- A. Construct mock-up, 4 feet long by 8 feet wide; include wall construction and typical transition and flashing details at openings such as windows and doors.
 - 1. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.08 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.
- B. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Source Limitations: Obtain primary air barrier materials and air barrier accessories from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Air Barrier Performance: Air barrier assembly and seals with adjacent construction shall be capable of performing as a continuous 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, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.03 AIR BARRIER MATERIALS - AIR AND VAPOR BARRIER

- A. Air and Vapor Barrier Sheet, Fluid-Applied: Synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, of 35 mils (0.9 mm) or thicker.
1. Physical and Performance Properties:
 - a. Dry Film Thickness: As recommended by weather barrier manufacturer.
 - b. Water Vapor Permeance: 0.1 perms, maximum; ASTM E96/E96M, Method B.
 - c. Air Permeance: 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.02 L/sec per sq m, maximum, at 75 Pa); ASTM E2178.
 - d. Air Leakage - Assembly: Pass, less than 1 percent; ASTM E2357.
 - e. Elongation: 250 percent, minimum; ASTM D412.
 - f. Tensile Strength: 100 psi, minimum; ASTM D412.
 - g. Flame Spread Index: Less than 25, Class A; ASTM E84.
 - h. Smoke Developed Index: Less than 450, Class A; ASTM E84.
 - i. Nail Sealability: Pass, no leakage; ASTM D1970/D1970M.
 - j. VOC Content: 100 g/L, maximum.
 - k. Air barrier shall be an approved component of an NFPA 285 tested exterior wall assembly as detailed on Drawings; tested in accordance with, and complying with the acceptance criteria, of NFPA 285.
 2. Products:
 - a. BASF; MasterSeal AWB 660 I: www.master-builders-solutions.basf.us
 - b. Carlisle Coatings & Waterproofing; Fire Resist Barritech NP: www.carlisleccw.com.
 - c. GCP Applied Technologies; Perm-a-Barrier NPL 10: www.gcpat.com.
 - d. Henry Company; Air-Bloc 16MR: www.henry.com.
 - e. Prosoco Inc.; R-Guard VB: www.prosoco.com.
 - f. Sto Corp.; StoGuard VaporSeal: www.stocorp.com.
 - g. Tremco Inc.; EXOAIR 130: www.tremcosealants.com.
 - h. W.R. Meadows; Air-Shield LSR: www.wrmeadows.com.
 - i. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORY MATERIALS

- A. Primers: As recommended for substrate by air barrier material manufacturer and accessory manufacturers.
- B. Transitions and Flashings:
1. General:
 - a. Products shall be compatible with air barrier and approved by the air barrier manufacturer.
 - b. Maintain the continuity of the air and water barrier as it transitions to adjacent materials.
 - c. Materials shall be compatible with adjacent materials.
 - d. Transitions and flashings shall be an approved component of an NFPA 285 tested exterior wall assembly as detailed on Drawings; tested in accordance with, and complying with the acceptance criteria of NFPA 285.
 2. Liquid-Applied Flashings and Sealants:
 - a. Non-asphaltic product: one part, fast curing, non-sag, elastomeric, gun grade, trowelable liquid flashing.

- b. Available products include, but are not limited to, the following:
 - 1) The Dow Chemical Company; Dowsil 758 Silicone Weather Barrier Sealant: www.dow.com.
 - 2) Momentive Performance Materials, Inc./GE; Elemax 5000 Liquid Flashing: www.siliconeforbuilding.com.
 - 3) Prosoco Inc.; R-Guard FastFlash: www.prosoco.com.
 - 4) Tremco, Inc.; Spectrem 1: www.tremcosealants.com.
3. Silicone Sheet Transitions:
 - a. Pre-cured silicone rubber sheets and pre-molded corners.
 - b. Install using liquid-applied flashings and sealants as an adhesive.
 - c. Available products include, but are not limited to, the following:
 - 1) The Dow Chemical Company; Dowsil Silicone Transition Strip: www.dow.com.
 - 2) Momentive Performance Materials, Inc./GE; UltraSpan UST/USM Pre-Cured Silicone Transition Sheet and Molded Corners: www.siliconeforbuilding.com.
 - 3) Prosoco Inc.; R-Guard SureSpan EX: www.prosoco.com.
 - 4) Tremco, Inc.; ProGlaze ETA and Spectrem Simple Seal: www.tremcosealants.com.
4. Flexible Fabric Flashing - Self-Adhering: Self-adhering stainless steel/polymer fabric flashing. ASTM A240/A240M stainless steel sheet bonded with rubber-based adhesive to one sheet of polymer fabric. Flashing shall be self-adhering using a pressure-sensitive adhesive.
 - a. Type 304 stainless steel.
 - 1) Thickness: 2 mils, minimum.
 - b. Available products include, but are not limited to, the following:
 - 1) York Manufacturing, Inc.; York 304: www.yorkmfg.com.
 - 2) Momentive Performance Materials, Inc./GE; GE Elemax SS Flashing: www.siliconeforbuilding.com.
5. Flexible Fabric Flashing: Stainless steel/polymer fabric flashing. ASTM A240/A240M stainless steel sheet bonded with rubber-based adhesive to one sheet of polymer fabric.
 - a. Type 304 stainless steel.
 - 1) Thickness: 2 mils, minimum.
 - b. Available products include, but are not limited to, the following:
 - 1) York Manufacturing, Inc.; Multi-Flash SS: www.yorkmfg.com.
 - 2) Prosoco Inc.; R-Guard SS ThruWall: www.prosoco.com.
6. Metal Flashings:
 - a. Stainless-steel sheet: ASTM A666 or ASTM A240/A240M, Type 304, 0.025 inch (24 gage) thick, minimum; smooth 2D (dull cold-rolled) finish..
 - 1) Fasteners: Stainless steel.
 - b. Comply with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.
- C. Sealants: Provide non-sag, single component, silicone sealants compatible with air barrier and approved by the air barrier manufacturer.
- D. Miscellaneous Accessories:
 1. As recommended by air barrier manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.
 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 2. Verify that substrates have cured and aged for minimum time recommended in writing by air barrier manufacturer.
 3. Verify that substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method according to ASTM D4263.

4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Mask and protect adjacent surfaces from over spray or dusting.
- C. Prepare static gaps and joints as recommended by air barrier manufacturer and as indicated on Drawings.
- D. Install transitions and flashings around corners of openings, around penetrations, and elsewhere as recommended by air barrier manufacturer and as indicated on Drawings.
 1. Use silicone sheet transitions and pre-molded corners adhered with liquid-applied flashings and sealants except where flexible fabric flashings or metal flashings are indicated on Drawings or recommended by air barrier manufacturer.
- E. Coordinate detailing of transitions to other materials in order to maintain a continuous air and water barrier.
 1. Ensure that transition materials are compatible with adjacent materials and substrates.
- F. When recommended by air barrier manufacturer, apply primer in accordance with manufacturer's instructions.
- G. Notify Architect of any issues prior to installing air barrier materials. Do not proceed with air barrier installation until issues have been resolved and approved by Architect.

3.03 INSTALLATION

- A. Apply primer to substrates as recommended by air barrier manufacturer.
- B. Ensure that all transitions, bridging of gaps and joints, corners, flashings, penetrations, and terminations are completed in accordance with the recommendations of the air barrier manufacturer and as indicated on Drawings
- C. Apply air barrier material according to air barrier manufacturer's written instructions and details.
 1. Apply continuous unbroken air barrier material to substrates.
 2. Apply air barrier material in full contact around protrusions such as masonry ties.
- D. Do not cover air barrier until it has been tested and inspected by testing agency.
- E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.
- F. Remove masking materials after installation.

3.04 FIELD QUALITY CONTROL

- A. Field inspections and tests will be performed by an independent testing agency under provisions of Section 01 4000 - Quality Requirements.
 1. Owner will 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. Verification of substrate preparations. Do not cover until inspections are complete.
 2. Verification that transitions and flashing details are installed properly. Do not cover until inspections are complete.
 3. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
 4. Air barrier dry film thickness.
 5. Site conditions for application temperature and dryness of substrates have been maintained.
 6. Maximum exposure time of materials to UV deterioration has not been exceeded.
 7. Compatible materials have been used.
 8. All penetrations have been sealed.

- C. Tests: As determined by testing agency from among the following tests:
 - 1. Air-Leakage-Location Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, chamber pressurization or depressurization with smoke tracers.
 - 2. Adhesion Testing: Air barrier assemblies will be tested for required adhesion to substrate according to ASTM D4541 for each 600 sq. ft. (56 sq. m) of installed air barrier or part thereof.
- D. Air barriers will be considered defective if they do not pass tests and inspections.
 - 1. Deficiencies shall be corrected by the Contractor at no additional cost to the Owner.
- E. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- F. Prepare test and inspection reports.

3.05 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 recommended by manufacturer.
 - 2. If exposed to these conditions for longer than recommended, remove and replace overexposed air barrier materials according to air barrier manufacturer's instructions.
- B. If damage occurs, patch damaged areas in accordance with air barrier manufacturer's instructions.

END OF SECTION

SECTION 07 4113 - METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Architectural standing seam roofing system of preformed steel panels.
- B. Underlayment.
- C. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 1500 - Wood Decking: Roof sheathing.
- B. Section 07 7200 - Roof Accessories: For installation of fence type snow guard inserts.
- C. Section 07 9200 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2010 (Reapproved 2015).
- C. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.
- D. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2019.
- E. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- G. UL 2218 - Standard for Impact Resistance of Prepared Roof Covering Materials Current Edition, Including All Revisions.
- H. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies Current Edition, Including All Revisions.
- I. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Storage and handling requirements and recommendations.
 - 2. Installation methods.
 - 3. Specimen warranty.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
- D. Verification Samples: For each roofing system specified, submit three samples of minimum size 12 inches square, representing actual roofing metal, thickness, profile, color, and texture.
 - 1. Include typical fastening detail.
- E. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of twenty years from Date of Substantial Completion.
- C. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of five years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Standing Seam Metal Roof Panels:
 - 1. AEP Span; www.aepspan.com.
 - 2. Centria; www.centria.com.
 - 3. MBCI, an NCI Building Systems company; www.mbc.com.
 - 4. Metal Sales Manufacturing Corp.; www.metalsales.us.com.
 - 5. for metal sales mfg - vertical seam
 - 6. ATAS International, Inc: www.atas.com/#sle.
 - 7. Berridge Manufacturing Company: www.berridge.com/#sle.
 - 8. Fabral: www.fabral.com/#sle.
 - 9. Firestone Building Products LLC: www.firestonebpc.com/#sle.
 - 10. Metal Roofing Systems, Inc: www.metalroofingsystems.biz/#sle.
 - 11. Metl-Span, a Division of NCI Group, Inc: www.metlspan.com/#sle.
 - 12. Morin Corporation: www.morincorp.com/#sle.
 - 13. Petersen Aluminum Corporation: www.pac-clad.com/#sle.
 - 14. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ARCHITECTURAL METAL ROOF PANELS

- A. Architectural Metal Roofing: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Performance Requirements:
 - 1. Water Penetration: No water penetration at 15 psf per ASTM E331.
 - 2. Wind Uplift: UL 580, Class 90.
 - 3. Hail Resistance: UL 2218, Class 4.
 - 4. Fire Resistance: UL 790, Class A.
- C. Metal Panels: Factory-formed panels with factory-applied finish.
 - 1. Steel Panels:
 - a. Aluminum-zinc alloy-coated steel conforming to ASTM A792/A792M; minimum AZ50 coating. (Galvalume)
 - b. Steel Thickness: Minimum 22 gage (0.029 inch).
 - 2. Profile: Standing seam, with minimum 1.5 inch seam height; concealed fastener system with self-locking snap-together seams.
 - 3. Texture: Smooth.
 - 4. Panel Coverage; Width: 16 inches.

2.03 ATTACHMENT SYSTEM

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.04 FABRICATION

- A. Panels: Provide factory fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
- B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.05 FINISHES

- A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch.
 - 1. Color: As selected from manufacturer's standards.

2.06 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, closure strips, and similar sheet metal items of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
 - 1. Downspouts: Open face, rectangular profile.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.
- C. Fence Type Snow Guard Inserts: Provide pre-finished sheet metal inserts for installation in fence type snow guards; refer to Section 07 7200 - Roof Accessories, for installation.
 - 1. Color and Finish: To match standing seam metal roof panels.
 - 2. Size: Coordinate with snow guard manufacturer.
- D. Sealants:
 - 1. Exposed Sealant: Elastomeric silicone as recommended by roof panel manufacturer, compatible with adjacent materials, and complying with requirements of Section 07 9200 - Joint Sealants.
 - 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
 - 3. Seam Sealant: Factory-applied, non-skinning, non-drying type.
- E. Underlayment for Wood Substrate: ASTM D226/D226M roofing felt, perforated type; covered by water-resistant rosin-sized building paper.
- F. Underlayment: Self-adhering rubber-modified asphalt sheet complying with ASTM D1970/D1970M; 40 mil total thickness; with strippable release film and woven polypropylene sheet top surface.
 - 1. Water Vapor Permeance: 0.1 perm, maximum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
 - 2. Designed to withstand temperatures up to 250 degrees F.
 - 3. Products:
 - a. Carlisle WIP Products, a division of Carlisle Construction Materials Inc.; WIP 300HT www.carlislewipproducts.com.
 - b. Firestone Building Products; Clad-Gard SA Metal Underlayment: www.firestonebpc.com.
 - c. GCP Applied Technologies Inc.; Grace Ice & Water Shield HT: www.gcpat.com.
 - d. Henry Company; Blueskin PE200HT : www.us.henry.com.
 - e. Polyguard Products, Inc.; Deckguard HT: www.polyguardproducts.com.

- f. Soprema, Inc.; Lastobond Shield HT: www.soprema.us.
- g. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation of preformed metal roof panels 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. Broom clean wood sheathing prior to installation of roofing system.
- B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- C. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
- D. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

- A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
 - 1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
 - 2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
- B. Accessories: Install all components required for a complete roofing assembly, including flashings, trim, closure strips, caps, rib closures, ridge closures, and similar roof accessory items.
- C. Install roofing felt and building paper slip sheet on roof deck before installing preformed metal roof panels. Secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners. Apply from eaves to ridge in shingle fashion, overlapping horizontal joints a minimum of 2 inches and side and end laps a minimum of 3 inches. Offset seams in building paper and seams in roofing felt.
- D. Underlayment:
 - 1. General: Install underlayment according to manufacturer's instructions and as specified.
 - a. Underlayments shall weather lap metal drip edges.
 - 2. Install self-adhering sheet underlayment with ends and edges weather lapped minimum 4 inches, stagger end laps of each consecutive layer.
 - a. Install without wrinkles; overlapping edges shall be sealed tightly without gaps.
 - b. Locations:
 - 1) Extend over entire roof area and return vertically against penetrating elements and sidewalls not less than 4 inches.
- E. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
 - 1. Incorporate concealed clips at panel joints, and snap panels together to provide weathertight joints.
 - 2. Provide sealant tape or other approved joint sealer at lapped panel joints.
 - 3. Install sealant or sealant tape, as recommended by panel manufacturer, at end laps and side joints.

3.04 CLEANING

- A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.05 PROTECTION

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
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05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

METAL ROOF PANELS
07 4113-6

SECTION 07 4213 - METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured metal panels for walls, with related flashings and accessory components.
- B. Exposed fastener metal wall panels. Located as indicated on drawings at clerestory level.
- C. Metal screen wall System over Primary Framing: Single-skin exposed fastener perforated metal wall panels. Located as indicated at roof top unit screen locations.
 - 1. Metal screen wall system includes secondary metal framing for panel attachment.

1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Wall panel substrate.
- B. Section 07 4213.23 - Metal Wall Panels: Adjacent Metal Composite Material system.
- C. Section 07 9200 - Joint Sealants: Sealing joints between metal wall panel system and adjacent construction.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.
- D. Samples: Submit three samples of wall panel, 12 inch by 12 inch in size illustrating finish color, sheen, and texture.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Owner's name and registered with installer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum 5 years of documented experience and approved by manufacturer.

1.06 MOCK-UP

- A. Construct mock-up for each type of metal wall panel system.
- B. Construct mock-up, 10 feet long by 10 feet wide; include panel system, attachments to building frame, associated vapor retarder and air seal materials, weep drainage system, sealants and seals, related insulation in mock-up.
- C. Locate where directed by Architect.
- D. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

- B. Store prefabricated material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

1.08 **WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a twenty year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.
- C. Correct defective work within a five year period after Date of Substantial Completion, including defects in water tightness and integrity of seals for metal wall panels.
- D. Installation Warranty for Building Rainscreen Assembly: Installer of exterior rainscreen assembly (including air/vapor barrier and attachments, framing, and exterior panels) to provide 10-year warranty that includes coverage for defective materials and/or workmanship. This warranty will also clearly include materials, labor, necessary activity to access these areas, and removal of any materials to effect repairs and restore to watertight conditions.
www.edacontractors.com/#sle

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

- A. Basis of Design:
 - 1. Metal Wall Panels - Exposed Fasteners: Econolap 3/4" Metal Wall Panels manufactured by CENTRIA: www.centria.com.
 - a. Metal Wall Panels over Outside-Insulated Framed Wall System: Single-skin exposed fastener metal wall panels applied as exterior rainscreen cladding over wall framing as shown in drawings. Metal wall panel installation specified in this Section includes secondary metal subgirt framing for panel attachment.
 - 2. Metal Wall Panels - Perforated Metal Panels: Ecoscreen Perforated Screenwall, Econolap 3/4" manufactured by CENTRIA: www.centria.com
- B. Other Acceptable Manufacturers - Metal Wall Panels - Exposed Fasteners:
 - 1. ATAS International, Inc; Wave Panel: www.atas.com/#sle.
 - 2. Berridge Manufacturing Company; S-Deck Panel: www.berridge.com/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- C. Other Acceptable Manufacturers - Metal Wall Panels: Perforated Metal Panels:
 - 1. ATAS International; Gaten Series, Architectural Systems: www.atas.com.
 - 2. Hendrick Architectural; Architectural Corrugated Metal Panels: www.hendrickcorp.com
 - 3. SHape Architectural; Perforated Metal Panels: www.shapearchitectural.com
 - 4. Substitutions: See Section 01 6000 - Product Requirements

2.02 **MANUFACTURED METAL PANELS - GENERAL**

- A. Wall Panel System: Factory fabricated prefabricated metal panel system, site assembled.
 - 1. Provide exterior panels.
 - 2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
 - 3. Design Pressure: In accordance with applicable codes.
 - 4. Maximum Allowable Deflection of Panel: $L/180$ for length(L) of span.
 - 5. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
 - 6. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
 - 7. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
 - 8. Corners: Factory-fabricated in one continuous piece with minimum 2 inch returns.

2.03 WALL PANELS - EXPOSED FASTENERS

- A. Corrugated Panels:
 - 1. Profile: Corrugated.
 - 2. Panel Coverage (Width): 32 inches, minimum.
 - 3. Panel Depth: 3/4 to 7/8 inches.
 - 4. Corrugation Pattern Repeat: 2.67 inches, on center.
 - 5. Material: Precoated steel sheet, 20 gage, 0.0359 inch minimum thickness.
 - 6. Side Laps: Overlapping.
 - 7. End Laps: Overlapping.
 - 8. Fasteners: Exposed.
 - 9. Panel Surface: Smooth.

2.04 WALL PANELS - PERFORATED METAL PANELS

- A. Corrugated Panels:
- B. Profile: Corrugated.
- C. Panel Coverage (Width): 32 inches, minimum.
- D. Panel Depth: 3/4 to 7/8 inches.
- E. Corrugation Pattern Repeat: 2.67 inches, on center.
- F. Material: Precoated steel sheet, 20 gage, 0.0359 inch minimum thickness.
- G. Side Laps: Overlapping.
- H. End Laps: Overlapping.
- I. Fasteners: Exposed.
- J. Panel Pattern: Staggered pattern, 1/8 inch perforations at 3/16 inch spacing, with 40 percent open area.

2.05 MISCELLANEOUS

- A. Internal and External Corners: Same material, thickness, and finish as wall panels and soffit panels; profile to suit system; shop cut and factory mitered to required angles.
- B. Expansion Joints: Same material, thickness and finish as wall panels and soffit panels; manufacturer's standard type, of profile to suit system.
- C. Trim, Closure Pieces, Caps, and Flashings: Same material, thickness and finish as wall panels and soffit panels; brake formed to required profiles.
- D. Anchors: Galvanized steel or Stainless steel.

2.06 MATERIALS

- A. Precoated Aluminum Sheet: ASTM B209 (ASTM B209M), 3105 alloy, O temper, smooth surface texture; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

2.07 FINISHES

- A. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat aluminum coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch.
 - 1. Color: Custom color to match Architect's sample.

2.08 ACCESSORIES

- A. Concealed Sealants: Non-curing butyl sealant or tape sealant.
- B. Exposed Sealants: Refer to Section 07 9200 - Joint Sealants.
- C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Exposed fasteners same finish as panel system.
- D. Field Touch-up Paint: As recommended by panel manufacturer.
- E. Bituminous Paint: Asphalt base.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that structural substrate is ready to receive panel system.
- B. Verify that weather barrier has been installed over substrate completely and correctly.

3.02 INSTALLATION

- A. Install panels on walls in accordance with manufacturer's instructions.
- B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- C. Fasten panels to structural supports; aligned, level, and plumb.
- D. Lap panel ends minimum 2 inches.
- E. Provide expansion and control joints where indicated.

3.03 TOLERANCES

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

3.04 CLEANING

- A. Remove site cuttings from finish surfaces.
- B. Remove protective material from wall panel surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07 4213.23 - METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior cladding consisting of formed metal composite material (MCM) sheet, secondary supports, and anchors to structure, attached to solid backup.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Installation of anchors and Panel support framing.
- B. Section 05 4000 - Cold-Formed Metal Framing: Panel support framing.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashing components integrated with this wall system.
- D. Section 07 9200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.03 ABBREVIATIONS

- A. MCM: Metal composite material.
- B. ACM: Aluminum composite material.

1.04 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- C. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip 2020.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- G. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- H. ASTM D523 - Standard Test Method for Specular Gloss; 2014.
- I. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives 1998 (Reapproved 2012).
- J. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics 2020.
- K. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2016.
- L. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007 (Reapproved 2015).
- M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- N. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.
- O. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, co-ordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.

1. Require attendance by the installer and relevant sub-contractors.
 2. Include MCM sheet manufacturer's representative and wall system manufacturer's representative to review storage and handling procedures.
 3. Review procedures for protection of work and other construction.
- B. Product Coordination and Limitations: Provide products that when combined with materials and components of other sections, form exterior wall assemblies as detailed on Drawings, that comply with NFPA 285 testing and acceptance criteria.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
1. Finish manufacturer's data sheet showing physical and performance characteristics.
 2. Storage and handling requirements and recommendations.
 3. Fabrication instructions and recommendations.
 4. Specimen warranty for finish, as specified herein.
- C. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
1. Physical characteristics of components shown on shop drawings.
 2. Storage and handling requirements and recommendations.
 3. Installation instructions and recommendations.
 4. Specimen warranty for wall system, as specified herein.
- D. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
1. Differentiate between shop and field fabrication.
 2. Indicate substrates and adjacent work with which the wall system must be coordinated.
 3. Include large-scale details of anchorages and connecting elements.
 4. Include flashing and trim details.
 5. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- E. Verification Samples: For each finish product specified, submit at least three samples, minimum size 6 inch square, and representing actual product in color and texture.
- F. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.
- G. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.
- H. NFPA 285 Documentation: For each product, submit documentation listing compatible materials and components that when used together in wall assemblies as detailed on Drawings, comply with NFPA 285 testing and acceptance criteria.
- I. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
- J. Manufacturer's Qualification Statement.
- K. Installer's Qualification Statement.
- L. Testing Agency's Qualification Statement.
- M. Maintenance Data: Care of finishes and warranty requirements.
- N. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.

- B. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing wall panel systems specified in this section.
 - 1. With not less than five years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of the type specified in this section.
 - 1. With minimum five years of documented experience.
 - 2. Approved by wall panel system manufacturer.
- E. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up testing of the type specified.
- F. Construct mock-up, 10 feet long by 10 feet wide; include panel system, attachments to building frame, associated air/water barrier materials, weep drainage system, sealants and seals in mock-up.
 - 1. Provide mock-up for evaluation of fabrication workmanship and installation.
 - 2. Locate where directed.
 - 3. Provide panels finished as specified.
 - 4. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 1. Protect finishes by applying heavy duty removable plastic film during production.
 - 2. Package for protection against transportation damage.
 - 3. Provide markings to identify components consistently with drawings.
 - 4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 - 1. Store in well ventilated space out of direct sunlight.
 - 2. Protect from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
 - 3. Store at a slope to ensure positive drainage of any accumulated water.
 - 4. Do not store in any enclosed space where ambient temperature can exceed 120 degrees F.
 - 5. Avoid contact with any other materials that might cause staining, denting, or other surface damage.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Wall System Warranty: Provide joint written warranty by manufacturer and installer, agreeing to correct defects in manufacturing or installation within a two year period after Date of Substantial Completion.
- C. MCM Sheet Manufacturer's Finish Warranty: Provide manufacturer's written warranty stating that the finish will perform as follows for minimum of 20 years:
 - 1. Chalking: No more than that represented by a No. 8 rating based on ASTM D4214.
 - 2. Color Retention: No fading or color change in excess of 5 Hunter color difference units, calculated in accordance with ASTM D2244.
 - 3. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Composite Material (MCM) Sheet Manufacturers - Products:
 - 1. 3A Composites USA Inc.; Alucobond PLUS: www.alucobondusa.com.
 - 2. Arconic Architectural Products LLC; Reynobond FR: www.reynobond.com.
 - 3. Citadel Architectural Products, Inc.; Envelope 2000 MCM: www.citadelap.com.
 - 4. Mitsubishi Chemical Composites America, Inc.; APOLIC/fr: www.alpolic-americas.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Wall Panel System Manufacturers - Products:
 - 1. Citadel Architectural Products, Inc.; Envelope 2000 RS: www.citadelap.com.
 - 2. Riverside Group; R4-300 System: www.riversidegroup.net.
 - 3. Royalton Architectural Fabrication, Inc.; Royaltech 3000 Panel System: www.rafpanels.com.
 - 4. Shaffner Heaney Associates, Inc., SHApe Architectural: Series RLS-9000: www.shapearchitectural.com.
 - 5. Sobotec Ltd.; SL-2000 PER System: www.sobotec.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WALL PANEL SYSTEM

- A. Wall Panel System: Metal panels, framing, flashings and trim, fasteners, and anchors designed to be supported by substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage or failure.
 - 1. Wall panel system shall be a rainscreen system designed to allow air movement behind the panels with weeps and channels to allow water and moisture entering the system to escape.
 - 2. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
 - 3. Provide panel jointing and weatherseal using reveal joints and gaskets but no sealant.
 - 4. Anchor panels to supporting framing without exposed fasteners.
 - 5. Overall System Depth (panel plus framing system): 2 inches, nominal.
- B. Performance Requirements
 - 1. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
 - 2. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
 - a. Design Wind Pressure: As indicated on Drawings.
 - b. Maximum deflection of perimeter framing member of L/175 normal to plane of the wall; maximum deflection of individual panels of L/60.
 - c. Maximum anchor deflection in any direction of 1/16 inch at connection points of framing members to anchors.
 - 3. Wall panel system shall be an approved component of an NFPA 285 tested exterior wall assembly as detailed on Drawings; tested in accordance with, and complying with the acceptance criteria, of NFPA 285.
 - 4. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
- C. Panels: One inch deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
 - 1. Reinforce corners with riveted aluminum angles.

2. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
 3. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.
 4. Secure members to back face of panels using structural silicone sealant approved by MCM sheet manufacturer.
 5. Fabricate panels under controlled shop conditions.
 6. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
 7. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.
 - a. Make panel lines, breaks, curves and angles sharp and true.
 - b. Keep plane surfaces free from warp or buckle.
 - c. Keep panel surfaces free of scratches or marks caused during fabrication.
 8. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.
- D. Metal Framing System: Manufacturer's standard extruded aluminum framing system.
1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
 2. Include base and sill angles, perimeter terminations, horizontal and vertical framing members, and flashings required for complete installation.
 3. Fabricate in pieces of longest practical lengths.

2.03 MATERIALS

- A. Aluminum Composite Material (ACM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
1. Overall Sheet Thickness: 0.236 inch (6mm), minimum.
 2. Face Sheet Thickness: 0.02 inches, minimum.
 3. Core: Fire retardant.
 4. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
 5. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 6. Flammability: Self-ignition temperature of 700 degrees F or greater, when tested in accordance with ASTM D1929.
 7. Fluoropolymer Coating System: Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness (DFT) of 0.9 mil. Comply with AAMA 2605.
 - a. Color(s): To match Architect's samples.
- B. Aluminum: Extruded components; ASTM B221.

2.04 FINISHES

- A. Factory Finish: Two coat fluoropolymer resin coating, approved by coating manufacturer for length of warranty specified for project, and applied by coil manufacturing facility that specializes in coil applied finishes.
1. Long-Term Performance: Not less than that specified under WARRANTY in PART 1.
- B. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, with at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mils, 0.0009 inch; color and gloss as indicated.

- C. Color/Texture: As selected by Architect from manufacturer's standard range.

2.05 ACCESSORIES

- A. Flashing: Sheet aluminum; 0.032 inch thick, minimum; finish and color to match ACM sheet; refer to Section 07 6200 for additional requirements.
- B. Anchors, Clips and Accessories:
1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
- C. Fasteners:
1. Stainless steel; exposed fasteners permitted only where absolutely unavoidable, subject to prior approval of the Architect.
 2. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- D. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15 mil dry film thickness per coat.
- E. Joint Sealer: Provide color to match wall panels; silicone sealant of type approved by ACM sheet manufacturer, and in compliance with ASTM C920.
1. Refer to Section 07 9200 for additional requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine dimensions, tolerances, and interfaces with other work.
1. Verify that weather barrier system is properly installed, refer to Section {id\#1000003} - {t\#1000003} for requirements.
- B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturers written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.

3.03 INSTALLATION

- A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.
- B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer.
- C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.
- D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.
- F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
- G. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.

2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.

H. Replace damaged products.

1. Exception: Field repairs of minor damage to finishes are permitted only when approved in writing by Architect, panel manufacturer, and fabricator.
2. Field Repairs to Finishes: Using materials and methods sufficient that repairs are not discernible when viewed at distance of 10 feet under all typical light conditions experienced at the project.

3.04 **FIELD QUALITY CONTROL**

- A. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.

3.05 **CLEANING**

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

3.06 **PROTECTION**

- A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

SECTION 07 5323 - EPDM MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Ethylene-propylene-diene-terpolymer (EPDM) roofing assembly; fully adhered. Including, but not limited to, the following:
 - 1. Cover board.
 - 2. Insulation, flat and tapered.
 - 3. Walkway pads.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.
- B. Section 07 7100 - Roof Specialties: Prefabricated roofing expansion joint flashing.
- C. Section 07 7200 - Roof Accessories: Roof-mounted units; prefabricated curbs.
- D. Section 08 6200 - Unit Skylights: Skylight frame, integral curb, and counterflashing.
- E. Section 22 1006 - Plumbing Piping Specialties: Roof drains.

1.03 ABBREVIATIONS

- A. EPDM: Ethylene-propylene-diene-terpolymer.

1.04 REFERENCE STANDARDS

- A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2019.
- B. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test) 2008, with Editorial Revision (2015).
- C. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2019.
- D. ASTM D5602/D5602M - Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens 2018.
- E. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015.
- F. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds 1998 (Reapproved 2017).
- G. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.
- H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- I. FM (AG) - FM Approval Guide current edition.
- J. FM 4470 - Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction 2016.
- K. FM DS 1-28 - Wind Design 2016.
- L. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components 2016, with Editorial Revision (2020).
- M. FM DS 1-49 - Perimeter Flashing; 2016.
- N. NRCA (RM) - The NRCA Roofing Manual 2019.
- O. NRCA (WM) - The NRCA Waterproofing Manual 2005.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of associated counterflashings installed under other sections.
- B. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, cover boards, insulation, vapor barrier, substrate board, adhesives, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, walkway pad locations, and sacrificial membrane locations.
- D. Samples for Verification: Submit three samples 4 by 4 inches in size illustrating roofing membrane, cover board, insulation, vapor barrier, substrate board, and walkway pads.
- E. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- I. Field Quality Control Reports.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience, and approved by manufacturer.

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. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.09 FIELD CONDITIONS

- A. Do not install roofing assembly during unsuitable weather and temperatures as defined by roofing membrane manufacturer.
- B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer Warranty: Provide 20 year manufacturer's system warranty where manufacturer shall repair or replace roofing system components that fail in materials or workmanship; includes failure to prevent penetration of water.
- C. Installer Warranty: Provide installation warranty where Installer agrees to correct defective Work within a 2 year period after Date of Substantial Completion; includes failure to prevent penetration of water.
- D. Correct defective Work within a two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Roof Assembly shall be provided by by one of the following:
 - 1. Carlisle SynTec Systems; www.carlislesyntec.com.
 - 2. Firestone Building Products; www.firestonebpco.com.
 - 3. Johns Manville; www.jm.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Source Limitations: Obtain roof membrane from one of the named Roof Assembly manufacturers and provide related roofing assembly components from either the roof membrane manufacturer or one of the listed product manufacturers; subject to approval of roof membrane manufacturer.

2.02 ROOFING ASSEMBLY

- A. Single-ply membrane roofing assembly consisting of the following:
 - 1. EPDM single-ply roof membrane; fully adhered.
 - 2. Cover board; fully adhered.
 - 3. Insulation, including tapered insulation; first layer mechanically fastened, all subsequent layers fully adhered.
 - 4. Vapor barrier at pool location only..
 - 5. Walkway pads.
- B. Performance Requirements:
 - 1. Comply with Factory Mutual (FM) Global and FM Approvals' RoofNav Listing requirements as follows:
 - a. Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals FM 4450 or FM Approvals FM 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
 - 1) Fire/Windstorm Classification: Class 1A-90.
 - 2) Hail-Resistance Rating: SH.
 - b. Comply with the following Property Loss Prevention Data Sheets:
 - 1) Data Sheet FM DS 1-28: Wind Design.
 - 2) Data Sheet FM DS 1-29: Roof Deck Securement and Above-Deck Roof Components.
 - 3) Data Sheet FM DS 1-49: Perimeter Flashing.
 - 2. Minimum Insulation Requirements: Excluding tapered insulation.
 - a. Minimum Layers of Insulation: Two.
 - b. Minimum Overall Thickness: 6 inches.
 - c. Minimum R-value: 30.
 - 3. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials as demonstrated by roof membrane manufacturer based on testing and field experience.

2.03 ROOF MEMBRANE

- A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); internally reinforced with fabric or scrim; complying with minimum properties of ASTM D4637/D4637M.
 - 1. Thickness: 0.060 inch (60 mil).
 - 2. Color: White.

2.04 COVER BOARD

- A. Faced Polyisocyanurate Cover Board: High compressive strength board, conforming to ASTM C1289, Type II, Class 4 - Faced with coated or uncoated polymer-bonded glass fiber mat facers on both major surfaces of the core foam.
 - 1. Grade and Compressive Strength: Grade 1, 80 psi.
 - 2. Board Size: 4 by 4, or 4 by 8 feet.

3. Board Thickness: 1/2 inch.
4. Insulation Thermal Resistance, R-value: 2.5, nominal.
5. Products:
 - a. Carlisle SynTec Systems; SecurShield HD Plus: www.carlislesyntec.com.
 - b. Firestone Building Products; ISOGARD HD Cover Board: www.firestonebpco.com.
 - c. Johns Manville; Invinsa Roof Board: www.jm.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.05 INSULATION

- A. Polyisocyanurate Board Insulation: Rigid cellular foam, conforming to ASTM C1289.
 1. Classifications:
 - a. Type II:
 - 1) Class 1 or 2 - Faced with glass fiber reinforced cellulosic felt facers or coated polymer-bonded glass fiber mat facers on both major surfaces of core foam.
 - 2) Compressive Strength: Grade 2 - 20 psi (138 kPa), minimum.
 - 3) Long Term Thermal Resistance (LTTR) R-value: At 1 inch thick; 5.7 at 75 degrees F.
 2. Board Size: 4 by 4, or 4 by 8 feet.
 3. Board Thickness: 2.0 inch.
 4. Tapered Board: Slope as indicated; minimum thickness 1/2 inch; fabricate of fewest layers possible.
 5. Board Edges: Square.
 6. Products:
 - a. Carlisle SynTec Systems; SecurShield: www.carlislesyntec.com.
 - b. Firestone Building Products; ISO 95+: www.firestonebpco.com.
 - c. Johns Manville; Enrgy 3: www.jm.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.06 VAPOR BARRIER

- A. Self-Adhering-Sheet Vapor Barrier: Polyethylene film laminated to layer of butyl rubber adhesive; cold applied, with slip-resisting surface and release paper backing.
 1. Properties:
 - a. Thickness: 30 mil total thickness, minimum; ASTM D1970/D1970M.
 - b. Tensile Strength: 50 lbf/in MD, 70 lbf/in XMD; ASTM D5147.
 - c. Elongation: 50 percent MD, 20 percent XMD; ASTM D5147; 73 degrees F.
 - d. Low Temperature Flexibility: Minus 30 degrees F; ASTM D5147.
 - e. Static Puncture: 90 lbf; ASTM D5602/D5602M.
 - f. Tear Strength: 80 lbf/in MD, 90 lbf/in XMD; ASTM D5601; at 73 degrees F.
 - g. Lap Adhesion: 6 lbf/in; ASTM D1876; at 73 degrees F
 - h. Peel Resistance: 5 lbf/in; ASTM D903.
 - i. Water Absorption: Less than 0.1 percent; ASTM D5147.
 - j. Water Vapor Permeability: Maximum permeance rating of 0.1 perm; ASTM E96/E96M, Procedure B.
 - k. Air Permeability: Maximum permeance of 0.0002 cu ft/min-sq ft; ASTM E2178.
 2. Products:
 - a. Carlisle SynTec Systems; VapAir Seal 725TR: www.carlislesyntec.com.
 - b. Firestone Building Products; V-Force: www.firestonebpco.com.
 - c. Johns Manville; JM Vapor Barrier SA: www.jm.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.07 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads.
 1. Size: 30 by 30 inches.
 2. Thickness: 0.30 inch, minimum.
 3. Color: Black.

4. Products:
 - a. Carlisle SynTec Systems; Sure-Seal EPDM Pressure-Sensitive Molded Walkway Pads: www.carlisesyntec.com.
 - b. Firestone Building Products; QuickSeam Walkway Pad: www.firestonebpco.com.
 - c. Johns Manville; JM EPDM Peel & Stick Walkpads: www.jm.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.08 ACCESSORIES

- A. Auxiliary Materials: Provide all materials recommended by roofing assembly manufacturer for a complete and weathertight assembly.
- B. Flexible Flashing Material: Same material as roofing membrane.
 1. Thickness: Same as roofing membrane unless otherwise recommended by roof membrane manufacturer.
 2. Uncured, unless otherwise recommended by roof membrane manufacturer.
- C. Factory Fabricated Flashings: Same material as roofing membrane
 1. Provide manufacturer's standard preformed flashings including, but not limited to, cone and vent sheet flashings, molded pipe boot flashings, and pourable sealer penetration pockets.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel bars, approximately 1 by 1/8 inch thick; with anchors.
- E. Membrane and Flashing Adhesive: As recommended by membrane manufacturer.
- F. Seaming Materials: Manufacturer's standard splice tape with release film.
- G. Insulation Adhesive: As recommended by insulation manufacturer and as follows:
 1. Full-spread, spray-applied, low-rise, two-component urethane adhesive.
- H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals FM 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer
- I. Sealants and Pourable Sealers: As recommended by membrane manufacturer.
- J. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.
- K. Vapor Barrier Primer: As recommended by vapor barrier manufacturer.

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 nailing strips are in place.

3.02 INSTALLATION - GENERAL

- A. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.
- B. Do not apply roofing membrane during unsuitable weather.
- C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.03 VAPOR BARRIER INSTALLATION

- A. Self-Adhering-Sheet Vapor Barrier: Install according to vapor barrier manufacturer's instructions. Prime substrate if required by manufacturer. Lap self-adhering-sheet vapor barrier sides and ends a minimum of 3 and 6 inches, respectively.
- B. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
- C. Completely seal vapor barrier at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.04 INSULATION INSTALLATION

- A. Ensure vapor barrier is clean and dry, continuous, and ready for application of insulation.
- B. Attachment of Insulation: Includes tapered insulation.
 - 1. Mechanically fasten first layer of insulation to deck in accordance with roof assembly manufacturer's instructions and FM (AG) Factory Mutual requirements.
 - 2. Embed each subsequent layer of insulation in adhesive in accordance with roof assembly manufacturers' instructions and FM (AG) Factory Mutual requirements.
 - 3. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.
- C. Cover Boards:
 - 1. Adhere cover board to insulation using adhesive according to roof assembly manufacturer's instructions and FM (AG) Factory Mutual requirements.
- D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- E. On metal deck, place boards perpendicular to flutes with insulation board ends bearing on deck flutes.
- F. Lay boards with edges in tight contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
 - 1. Gaps between boards and adjacent materials shall not exceed 1/4 inch.
- G. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 24 inches.
- H. Do not apply more insulation than can be covered with membrane in same day.

3.05 MEMBRANE INSTALLATION

- A. Fully adhere membrane roofing system in accordance with manufacturer's recommendations and NRCA (RM) applicable requirements.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Shingle joints on sloped substrate in direction of drainage.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
 - 1. Overlap edges and ends and seal seams by splice tape. Seal permanently waterproof.
- E. At intersections with vertical surfaces:
 - 1. Fully adhere flexible flashing over membrane and up to nailing strips.
 - 2. Secure flashing to nailing strips at 4 inches on center.
- F. At gravel stops, extend membrane under gravel stop and down face of wall behind gravel stop fascia. Secure with fasteners to nailing strips.
- G. At copings, unless otherwise indicated, extend membrane under coping and down face of wall behind front of coping. Secure with fasteners to nailing strips.
- H. Around roof penetrations, seal flanges and flashings with flexible flashing.
- I. Install roofing expansion joints where indicated. Make joints watertight.
 - 1. Install prefabricated joint components in accordance with manufacturer's instructions.
- J. Coordinate installation of roof drains and sumps and related flashings.

- K. Coordinate installation of associated counterflashings installed under other sections.

3.06 SACRIFICIAL MEMBRANE INSTALLATION

- A. At roof exhausts which expel vegetable oils, animal fats, and other kitchen wastes, or expel other chemicals detrimental to the roof membrane, install a sacrificial membrane over the roof membrane in an 8 foot radius, minimum, around the roof exhaust.
1. Sacrificial membrane shall be the same material and thickness as the roof membrane.

3.07 WALKWAY PAD INSTALLATION

- A. Walkway Pads: Install walkway products according to manufacturer's instructions.
- B. Install walkway pads at the following locations:
1. Perimeter of each rooftop unit.
 2. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 3. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 4. Top and bottom of each roof access ladder.
 5. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 6. At downspout discharges onto roof assembly.
 7. Other locations as indicated on Drawings.
 8. As required by roof membrane manufacturer's warranty requirements.
- C. Provide 6 inch clearance between adjoining pads.
- D. Adhere walkway products to substrate with compatible adhesive according to walkway pad manufacturer's instructions.

3.08 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field quality control and inspection.
- B. Require site attendance of roof assembly manufacturer daily during installation of the Work.
- C. Final Roof Inspection: Arrange for roof assembly manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements

3.09 CLEANING

- A. Clean all dirt, footprints, overspray, spillage, debris, and other construction waste materials from the roof assembly.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

3.10 PROTECTION

- A. Protect installed roofing and flashings from construction operations.

END OF SECTION

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TMP19040
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SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed sheet metal items, including, but not limited to, the following:
 - 1. Flashings.
 - 2. Counterflashings.
 - 3. Other items as indicated on Drawings.
- B. Manufactured reglets.
- C. Deck-mounted double wall, insulated curb for skylights.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: For reglets cast in concrete.
- B. Section 04 2000 - Unit Masonry: For installation of reglets embedded in masonry.
- C. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.
- D. Section 07 7100 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.
- E. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.
- F. Section 08 6200 - Unit Skylights: Integral metal curbs.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- C. ASTM B32 - Standard Specification for Solder Metal 2008 (Reapproved 2014).
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- E. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- G. FM DS 1-49 - FM Global Property Loss Prevention Data Sheet - Perimeter Flashing; 2016.
- H. NRCA (RM) - The NRCA Roofing Manual 2019.
- I. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples:
 - 1. For each material and finish, submit three samples 4 by 4 inch in size illustrating metal finish color.
 - 2. Reglets: Submit three samples, 4 inches long, full size, of each type and finish.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) requirements, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.07 **MOCK-UP**

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of typical wall flashing with counterflashing, approximately 10 feet long, including supporting construction cleats, seams, attachments and accessories.
 - 2. Locate where directed.
 - 3. Mock-up may remain as part of the Work.

1.08 **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 **PERFORMANCE REQUIREMENTS**

- A. Perform work in accordance with SMACNA (ASMM) and NRCA (RM) requirements, unless more stringent requirements are indicated.
- B. Sheet metal flashing and trim shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- C. Sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- D. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standards, and by Data Sheet FM DS 1-49: Perimeter Flashing, for application, but not less than thickness of metal being secured.
- E. Coordination:
 - 1. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
 - 2. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

2.02 **SHEET MATERIALS**

- A. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 20 gage, (0.032 inch) thick, minimum; plain finish shop pre-coated with fluoropolymer coating.
 - 1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 - 2. Color: Two or three-coat custom color to match Architect's sample.
- B. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 24 gage, 0.025 inch thick, minimum; smooth 2D (dull, cold rolled) finish.

2.03 **FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes.
- C. Fabricate cleats of same material as sheet, interlocking with sheet.
- D. Form pieces in longest possible lengths.
- E. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- F. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- G. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- H. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

2.04 DECK-MOUNTED DOUBLE WALL, INSULATED CURBS

- A. Manufacturers: Subject to compliance with requirements, provide products by Wasco Part of the Velux Group, Wells, ME.
 - 1. Model: CCAW Insulated Curb Only
 - 2. Substitutions: See Section 01 6000-Product Requirements.
- B. Materials:
 - 1. General: Provide all related materials, fasteners, hardware and accessories for a complete installation.
 - 2. Curbs: Fabricate from double skin of 1100-H14 sheet aluminum, insulated with 1-1/2 inch extruded polystyrene insulation. Provide thermal break at top and bottom.
 - a. Provide 0.025 inch minimum thickness outer skin, mill finish. Outer skin to be 0.032 inch when length exceeds nominal 48".
 - b. Provide 0.032 inch minimum thickness inner skin, prefinished white.
 - c. Curb assembly maximum U-factor of 0.17.
 - 3. Wood Nailer: Provide 2x2 preservative treated wood nailer.
 - 4. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other non-corrosive metal as recommended by manufacturer.
 - 5. Bituminous Coating: SSPC-Paint 12, solvent type, bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4 mm) dry film thickness per coating.
- C. Fabrication
 - 1. Fabricate corners using 2-piece extruded aluminum corner system.
 - 2. Fabricate components to accommodate expansion and contraction.
 - 3. Form shapes with sharp profiles, straight and free of defects or deformation.

2.05 ACCESSORIES

- A. General: Provide all related materials, fasteners, hardware and accessories for a complete installation.
- B. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
 - 1. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Exposed Fasteners: Heads matching color of sheet metal using factory-applied coating.
- C. Protective Backing Paint: Zinc molybdate alkyd.
- D. Concealed Sealants: Non-curing butyl sealant.
- E. Exposed Sealants: ASTM C920; elastomeric silicone sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- F. Solder: ASTM B32; Sn96 type for stainless steel.

2.06 REGLETS

- A. Manufactured Reglets: Units of type and profile required, formed to securely interlock with separate counterflashing pieces. Provide factory-mitered and welded corners and junctions.
 - 1. Material: Same material and finish as counterflashing metal.
 - 2. Surface Mounted Type: Provide slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - 3. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
 - 4. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
 - 5. Accessories:
 - a. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge
 - 6. Manufacturers:

- a. Cheney Flashing Company: www.cheneyflashing.com.
- b. Fry Reglet Corporation: www.fryreglet.com.
- c. Heckmann Building Products, Inc.: www.heckmannbuildingprods.com.
- d. Hohmann & Barnard, Inc.: www.h-b.com.
- e. Substitutions: See Section 01 6000 - Product Requirements.

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.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. To prevent galvanic action or corrosion, back paint concealed metal surfaces with protective backing paint, minimum dry film thickness of 3 mil, where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates.

3.03 INSTALLATION - GENERAL

- A. Install flashings and trim in accordance with SMACNA (ASMM) and NRCA (RM) requirements, unless more stringent methods are indicated.
- B. Unless otherwise indicated, provide pre-finished aluminum flashings and trim in areas exposed to public view; at all other areas provide stainless steel flashings.
- C. Insert flashings into reglets to form tight fit; secure in place with plastic wedges; seal flashings into reglets with sealant.
 1. Counterflashings shall lap base flashing 4 inches, minimum.
- D. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.
- E. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Seal metal joints watertight.
- G. For stainless steel, solder metal joints for full metal surface contact, and after soldering wash metal clean with neutralizing solution and rinse with water.
 1. Do not solder aluminum.

3.04 REGLETS

- A. Surface Mounted Type: Install according to manufacturer's instructions.
- B. Refer to Section 03 3000 - Cast-in-Place Concrete, for casting reglets in concrete.
- C. Refer to Section 04 2000 - Unit Masonry, for embedding reglets in masonry.

3.05 DECK-MOUNTED DOUBLE WALL, INSULATED CURBS

- A. Examine substrates and conditions with installer present for compliance with requirements for installation tolerances and other conditions affecting installation.
- B. Installation
 1. General: Comply with manufacturer's written instructions for protecting, handling, and installing curb.
 2. Coordinate with installation of vapor barriers, roof insulation, roofing, and flashing as required to assure that each element of the work performs properly and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

3. Counter Flashing: Where counter flashing is required as component of the curb, install to provide an adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant.

3.06 TOLERANCES

- A. Sheet Metal Flashing and Trim Tolerances:
 1. Install to tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings.
 2. Install with 1/8 inch maximum offset of adjoining faces and of alignment of matching profiles.

3.07 CLEANING

- A. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal manufacturer. Maintain sheet metal flashing and trim in clean condition.
- B. Replace sheet metal flashing and trim damaged or deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 07 7100 - ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured roof specialties, including:
 - 1. Fascia/gravel stops.
 - 2. Roof expansion joint cover assemblies.

1.02 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems 2017.
- C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- D. NRCA (RM) - The NRCA Roofing Manual 2019.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- D. Samples:
 - 1. For each material and finish, submit three samples 4 by 4 inch in size illustrating metal finish color.
 - 2. Provide a full size sample, 12 inches long, for each of the following:
 - a. Roof edges/gravel stops.
 - b. Roof expansion joint cover assemblies.

1.04 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.

PART 2 PRODUCTS

2.01 COMPONENTS

- A. Fascia/Gravel Stop: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
 - 1. Configuration: Fascia, cant, and edge securement for roof membrane.
 - 2. Accessories:
 - a. Fascia extenders with continuous hold-down cleats.
 - 1) Depth: As indicated on Drawings.
 - 3. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.
 - 4. Material: Formed aluminum sheet, 0.050 inch thick, minimum.
 - 5. Finish: PVDF coating; 70 percent polyvinylidene fluoride.
 - 6. Color: Two or three coat custom color to match Architect's sample.
 - 7. Products:
 - a. Architectural Products Co.; AP Snap-On Fascia: www.archprod.com.
 - b. ATAS International, Inc.; Edge-Lok 2: www.atas.com.
 - c. Carlisle SynTec Systems; SecureEdge 200 Fascia: www.carlisesyntec.com.
 - d. Firestone Building Products; Firestone EdgeGard - Snap-On: www.firestonebpco.com.

- e. Johns Manville; Presto-Tite Edge One Fascia System: www.jm.com.
 - f. Metal-Era; Perma-Tite System 200 Fascia: www.metalera.com.
 - g. OMG Roofing Products; EconoSnap Fascia System: www.omgroofing.com.
 - h. Petersen Aluminum Corp.; PAC Snap Edge Fascia: www.pac-clad.com.
 - i. Substitutions: See Section 01 6000 - Product Requirements.
- B. Roof Expansion Joint Covers - Bellows: Composite construction of flexible EPDM or neoprene flashing of black color with closed cell urethane foam backing, each edge seamed to stainless steel sheet metal flanges, designed for nominal joint width of 2 inch. Include special formed corners, tees, intersections, and wall flashings, each sealed watertight.
1. Type: Roof-to-roof and roof-to-wall; cant based.
 2. Accessories: Include the following:
 - a. Manufacturer's standard moisture barrier.
 3. Products:
 - a. Balco, Inc.
 - b. Construction Specialties, Inc.; BRJW-CF Series: www.c-sgroup.com.
 - c. Johns Manville.
 - d. MM Systems Corp.
 - e. Inpro Corporation
 - f. Nystrom
 - g. Watson Bowman Acme Corp.
 - h. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FINISHES

- A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system. Two or three-coat system, unless otherwise indicated.

2.03 ACCESSORIES

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.
- C. Roof Cement: ASTM D4586/D4586M, Type I.
- D. Protective Backing Paint: Zinc molybdate alkyd.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 PREPARATION

- A. To prevent galvanic action or corrosion, back paint concealed metal surfaces with protective backing paint, minimum dry film thickness of 3 mil, or provide other permanent separation as recommended by unit manufacturer, where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates.

3.03 INSTALLATION - GENERAL

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Seal joints within components when required by component manufacturer.
- C. Anchor components securely.
- D. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

3.04 CLEANING

- A. On completion of manufactured roof specialties installations, remove unused materials and clean finished surfaces as recommended by roof specialties manufacturers. Maintain finishes in clean condition.
- B. Replace manufactured roof specialties damaged or deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

TMP Architecture, Inc.
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TMP19040
MaMA1909

SECTION 07 7200 - ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Equipment rails.
- B. Roof hatches.
- C. Snow guards.

1.02 RELATED REQUIREMENTS

- A. Section 05 3100 - Steel Decking.
- B. Section 07 4113 - Metal Roof Panels.

1.03 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 2019a.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. 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.
- C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
- D. Samples:
 - 1. For each material and finish, submit three samples 4 by 4 inch in size illustrating metal finish color.

1.05 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.

PART 2 PRODUCTS

2.01 EQUIPMENT RAILS

- A. Manufacturers:
 - 1. The Pate Company: www.patecurbs.com.
 - 2. LMCurbs: www.lmcurbs.com.
 - 3. Roof Products & Systems (RPS), Hart & Cooley Inc.: www.rpscurbs.com.
 - 4. Thybar Corporation: www.thybar.com.
 - 5. Vent Products Company, Inc.: www.ventproducts.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Equipment Rails: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
 - 1. Equipment Rail Mounting Substrate: Rail substrate consists of corrugated metal roof deck with insulation.
 - 2. Provide straight curbs on each side of equipment, with top of curbs parallel with metal roofing system and each other for equipment mounting.
 - 3. Sheet Metal Material:
 - a. Galvanized Steel: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33; G90 coating designation; 18 gage, 0.048 inch thick, minimum.
 - 1) Finish: Factory primed.
 - 4. Nailer: Provide preservative treated wood nailers along top of rails.

5. Height Above Finished Roof Surface: 12 inches, minimum.
6. Provide layouts and configurations indicated on drawings.

2.02 ROOF HATCHES

- A. Roof Hatch Manufacturers:
 1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com.
 2. Acudor Products Inc: www.acudor.com.
 3. Babcock-Davis: www.babcockdavis.com.
 4. Bilco Company: www.bilco.com.
 5. Milcor, Inc., Hart & Cooley Inc.: www.milcorinc.com.
 6. Nystrom, Inc: www.nystrom.com.
 7. The Pate Company; www.patecurbs.com
 8. Substitutions: See Section 01 6000 - Product Requirements.
- B. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, straight sides, and integrally formed deck-mounting flange at perimeter bottom.
 1. Type: Single-leaf lid.
 2. Roof Hatch Mounting Substrate: Substrate consists of corrugated metal roof deck with insulation.
 3. Performance Requirements:
 - a. Loads:
 - 1) External Live Load: 40 psf, minimum.
 - 2) Wind Uplift: 20 psf.
 - b. Lid operation shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - 1) Operation shall not be affected by temperature.
 - c. Entire hatch assembly shall be weather tight.
 4. Sheet Metal Material: For lid and curb.
 - a. Galvanized Steel: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33; G90 coating designation; 14 gage, 0.0747 inch thick, minimum.
 - 1) Finish: Powder coat.
 - 2) Color: As selected by Architect from manufacturer's standard line of colors.
 5. Insulation: Manufacturer's standard; 1 inch rigid glass fiber, located on outside face of curb.
 6. Liners for Lid and Curb: Same material as curb, of manufacturer's standard thickness and finish.
 7. Curb Height: 12 inches from surface of roof deck, minimum.
 8. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
 - a. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
 - b. Hinges: Heavy duty pintle type.
 - c. Hold open arm with vinyl-coated handle for manual release.
 - d. Latch: Upon closing, engage latch automatically and reset manual release.
 - e. Manual Release: Pull handle on interior and exterior.
 - f. Locking: Padlock hasp on interior.
 9. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder.
 - a. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
 - b. Height: 42 inches above finished roof deck.

- c. Material: Steel tube.
- d. Finish: Manufacturer's standard baked enamel or powder coat.
- e. Color: Yellow.

2.03 SNOW GUARDS

- A. Unit Snow Guards: Individual projecting polycarbonate shapes, attached between standing seams of roof panel, and mechanically fastened to roof deck.
 - 1. Projecting Polycarbonate Shapes: Clear polycarbonate plastic with UV stabilizers, semi-circular design.
 - 2. Manufacturers:
 - a. Berger Building Products: www.bergerbp.com/#sle.
 - b. Rocky Mountain Snow Guards, Inc; ST9 Snow Guard: www.rockymountainsnowguards.com/#sle.
 - c. TRA Snow and Sun: www.trasnowandsun.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.
- B. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
- C. Roof-Hatch Installation:
 - 1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
 - 2. Attach ladder-assist post according to manufacturer's instructions.
- D. Snow Guard Installation:
 - 1. Space rows as recommended by manufacturer.
 - 2. Install brackets to vertical ribs in straight rows.
 - 3. Do not use fasteners that will penetrate metal roofing or fastening methods that void metal roofing finish warranty.

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

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05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

ROOF ACCESSORIES
07 7200-4

SECTION 07 8400 - FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
 - 1. Firestopping of joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: Cutting and patching.
- B. Section 09 2116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).
- B. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems 2015 (Reapproved 2019).
- C. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestops 2019.
- D. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers 2010a (Reapproved 2015).
- E. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus 2015b, with Editorial Revision (2016).
- F. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies 2013 (Reapproved 2017).
- G. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.
- H. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, each type of joint, fire rating of the penetrated assembly, firestopping test or design number, and illustration of each firestopping system.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Installer Qualification: Submit qualification statements for installing mechanics.

1.05 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Verification of minimum 5 years documented experience installing work of this type.

1.06 MOCK-UP

- A. Install one firestopping assembly representative of each fire rating design required on project.
 - 1. Where one design may be used for different penetrating items or in different wall or floor constructions, install one assembly for each different combination.
 - 2. Where firestopping is intended to fill a linear opening, install minimum of 1 linear ft.
- B. Obtain approval of authorities having jurisdiction (AHJ) before proceeding.
- C. If accepted, mock-up will represent minimum standard for the Work.

- D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.07 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. 3M Fire Protection Systems; www.3m.com.
 - 2. A/D Fire Protection Systems; www.adfire.com.
 - 3. Hilti Firestop; www.hilti.com.
 - 4. RectorSeal Firestop; www.rectorseal.com.
 - 5. Specified Technologies, Inc. (STI); www.stifirestop.com.
 - 6. Tremco Fire Protection Systems; www.tremcofirestop.com.
 - 7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Firestopping Materials: Any materials complying with firestopping assembly design requirements including, but not limited to, the following:
 - 1. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
 - 2. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
 - 3. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
 - 4. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
 - 5. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
 - 6. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
 - 7. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
 - 8. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
 - 9. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
 - 10. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants
- B. Accessory Materials: For each firestopping assembly, provide all primers, forming/damming/backing materials, collars, sleeves, and related materials for a complete installation.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. General:
 - 1. Provide firestopping assemblies indicated, or, if not indicated, as required to comply with fire ratings indicated.

2. Fire Ratings: As indicated on Drawings.
3. Joint Firestopping:
 - a. Nominal Widths: As indicated on Drawings.
 - b. Movement Capabilities: Class 1, 50 percent compression or extension, unless otherwise indicated or required.
- B. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 1. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - a. Temperature Rise: Provide systems that have been tested to show T Rating as indicated or required.
 - b. Air Leakage: Provide systems that have been tested to show L Rating as indicated, at Smoke Barriers, and elsewhere as indicated or required.
 - c. Watertightness: Provide systems that have been tested to show W Rating as indicated or required.
- C. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
 1. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
 - a. Movement: Provide systems that have been tested to show movement capability as indicated or required.
 - b. Temperature Rise: Provide systems that have been tested to show T Rating as indicated or required.
 - c. Air Leakage: Provide systems that have been tested to show L Rating as indicated or required..
 - d. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated or required..
 2. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
 - a. Movement: Provide systems that have been tested to show movement capability as indicated or required.
 3. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
 - a. Movement: Provide systems that have been tested to show movement capability as indicated or required.
 - b. Air Leakage: Provide systems that have been tested to show L Rating as indicated or required.
 - c. Watertightness: Provide systems that have been tested to show W Rating as indicated or required.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by Owner's Independent Testing Agency.
- C. Do not cover installed firestopping until inspected by authorities having jurisdiction.

3.04 IDENTIFICATION

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

3.05 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, may examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.06 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.07 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9100 - PREFORMED JOINT SEALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Precompressed foam seals.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Liquid and mastic joint sealants and their backing materials.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's technical data sheets for each product, including chemical composition, movement capability, color availability, limitations on application, and installation instructions.
- C. Color Cards: For color selection.
- D. Samples: Submit three samples 6 inches long illustrating each color selected.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section with at least 5 years of documented experience and approved by manufacturer.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a 5 year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealers that fail to achieve watertight seal or exhibit loss of adhesion or cohesion.

PART 2 PRODUCTS

2.01 PRECOMPRESSED FOAM SEALS

- A. Precompressed Foam Seal: Silicone-faced, urethane foam impregnated with water-repellent; chemical-resistant.
 - 1. Color: As selected by Architect from manufacturer's standard colors.
 - 2. Size as required to provide water-tight seal when installed.
 - 3. Provide factory fabricated corners, changes in direction, transitions, and terminations.
 - 4. Performance Requirements:
 - a. Provide a weathertight, airtight, UV-stable, insulated joint seal.
 - b. Nominal Joint Width: 2 inches.
 - c. Minimum Joint Width: 1 inch.
 - d. Maximum Joint Width: 3 inches.
 - e. Adapts to fit tightly against irregularities of adjacent substrates.
 - f. R-Value: 2 per inch; ASTM C518.
 - 5. Products:
 - a. Balco, Inc.; BCSW Wall Compression Seals: www.balcousa.com.
 - b. Construction Specialties, Inc.; VF Series: www.c-sgroup.com.
 - c. Emseal Joint Systems, Ltd.; Seismic Colorseal: www.emseal.com.
 - d. Inpro Corporation; 1200 Series Foam Seals: www.inprocorp.com.
 - e. Watson Bowman Acme Corp./BASF Corp.; SWS Series: www.wbacorp.com.
 - f. Willseal LLC; Willseal Color Coreseal V: www.willseal.com.
 - g. Substitutions: See Section 01 6000 - Product Requirements

2.02 ACCESSORIES

- A. Adhesive: As recommended by seal manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive this work.
- B. Measure joint dimensions and verify that seal products are of the correct size to properly seal the joints.

3.02 PREPARATION

- A. Properly prepare construction components adjacent to the work of this section to prevent damage and disfigurement due to this work.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's written instructions.
- B. Precompressed Foam Seals:
 - 1. Install only when ambient temperature is within recommended application temperature range of adhesive. Consult manufacturer when installing outside this temperature range.
 - 2. Prepare joints and install seals in accordance with manufacturer's written recommendations.
 - 3. Remove loose materials and foreign matter that could impair adhesion of sealant.
 - 4. Do not stretch precompressed seal; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 CLEANING

- A. Clean adjacent soiled surfaces.

3.05 PROTECTION

- A. Protect joints from damage until adhesives have properly cured.

END OF SECTION

SECTION 07 9200 - JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping: Firestopping sealants.
- B. Section 07 9100 - Preformed Joint Seals
- C. Section 07 9100 - Preformed Joint Seals: Precompressed foam, gaskets, and strip seals.
- D. Section 07 9513 - Expansion Joint Cover Assemblies: Sealants forming part of expansion joint cover assemblies.
- E. Section 08 7100 - Door Hardware: Setting exterior door thresholds in sealant.
- F. Section 08 8000 - Glazing: Glazing sealants and accessories.
- G. Section 09 2116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- H. Section 09 3000 - Hard Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.03 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015.
- B. ASTM C834 - Standard Specification for Latex Sealants 2017.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2018.
- F. ASTM C1311 - Standard Specification for Solvent Release Sealants 2014.
- G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2018.
- H. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints 2019.
- I. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015, with Editorial Revision (2017).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Sample product warranty.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where custom colors are not specified, submit manufacturer's color cards showing standard colors available for selection.

- E. Samples for Verification: For each sealant color, submit at least three physical samples for color verification.
 - 1. Provide 1/2 inch wide joint sealant samples formed between two 4 inch long strips of material matching appearance of exposed surfaces adjacent to joint sealants.
- F. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
- G. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.05 **QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least 5 years of documented experience.
- C. Owner may employ an independent testing agency to perform the field quality control inspection and testing as referenced in PART 3 of this section and as follows, to prepare and submit the field quality control plan and log, and to provide recommendations of remedies in the case of failure.
 - 1. Contractor shall cooperate with testing agency and repair failures discovered.
 - 2. Otherwise, if Owner does not employ an independent testing agency, Contractor shall perform its own field quality control measures including the following:
 - a. Field Quality Control Plan and Log.
 - b. Field Adhesion Test Procedures.
- D. Field Quality Control Plan:
 - 1. Visual inspection of entire length of sealant joints.
 - 2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
 - a. For each different sealant and substrate combination, allow for one test every 12 inches in the first 10 linear feet of joint and one test every 120 inches thereafter.
 - b. If any failures occur in the first 10 linear feet, continue testing at 48 inch intervals at no extra cost to Owner.
- E. Field Adhesion Test Procedures:
 - 1. Allow sealants to fully cure as recommended by manufacturer before testing.
 - 2. Have a copy of the test method document available during tests.
 - 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
 - 4. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
 - 5. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
 - a. Record results on Field Quality Control Log.
 - b. Repair failed portions of joints.

1.06 **WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 **JOINT SEALANT APPLICATIONS**

- A. Scope:

1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints as indicated.
2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Joints between dissimilar materials.
 - c. Other joints as indicated.
3. Do not seal the following types of joints.
 - a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
 1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
 2. Lap Joints between Manufactured Metal Panels: Butyl rubber, non-curing.
 3. Control and Expansion Joints in Concrete Paving: Self-leveling silicone "traffic grade" sealant.
- C. Interior Joints: Use non-sag acrylic emulsion latex sealant, unless otherwise indicated.
 1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
 2. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
 3. Wall Joints in Wet Areas - Continuous Immersion: Non-sag polyurethane sealant for continuous liquid immersion.
 4. Interior Sides of Aluminum Framing in Exterior Walls: Use non-sag non-staining silicone sealant, unless otherwise indicated.
 - a. Includes, but is not limited to, curtain walls, storefronts, and metal-framed skylights.
 5. Control Joints in Interior Concrete Slabs: Self-leveling silicone "traffic grade" sealant.
 6. Column Isolation Joints in Interior Concrete Slabs: Self-leveling silicone "traffic grade" sealant.
 7. Floor Joints in Wet Areas: Self-leveling silicone "traffic grade" sealant; not for continuous liquid immersion
 8. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; clear, unless otherwise indicated.
 9. Joints between countertops and walls: Mildew-resistant silicone sealant; clear, unless otherwise indicated.
- D. Interior Wet Areas: Includes, but is not limited to, toilet rooms, showering areas, locker rooms, laundry areas, kitchens, and food service areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

2.02 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Type S, Uses NT, A, G, M and O; not expected to withstand continuous water immersion or traffic.
 1. Movement Capability: Plus and minus 50 percent, minimum.
 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.

3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 4. Hardness Range: Comply with one of the following:
 - a. 15 to 35, Shore A, when tested in accordance with ASTM C661.
 - b. 25 to 35, Shore A, when tested in accordance with ASTM D2240.
 5. Color: Custom color(s) to match Architect's sample(s).
 6. Cure Type: Single-component, neutral moisture curing.
 7. Service Temperature Range: Minus 40 to 250 degrees F.
 8. Products:
 - a. Dow Corning Corporation; 756 SMS Building Sealant: www.dowcorning.com.
 - b. Momentive Performance Materials, Inc./GE; SCS9000 SilPruf NB: www.siliconeforbuilding.com.
 - c. Pecora Corporation; 890NST: www.pecora.com.
 - d. Sika Corporation; Sikasil WS-295 FPS: www.usa.sika.com.
 - e. Tremco, Inc.; Spectrem 3: www.tremcosealants.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Traffic Grade Silicone Sealant: ASTM C920, Grade NS, Type S, Uses T, M, and O; not expected to withstand continuous water immersion.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum
 2. Hardness Range: Comply with one of the following:
 - a. 5 to 15, Shore A, when tested in accordance with ASTM C661.
 - b. 85, Shore 00, when tested in accordance with ASTM C661.
 3. Color: To be selected by Architect from manufacturer's full range.
 4. Cure Type: Single-component, neutral moisture curing.
 5. Service Temperature Range: Minus 40 to 250 degrees F.
 6. Products:
 - a. Dow Corning; NS Parking Structure Sealant: www.dowcorning.com.
 - b. Pecora Corporation; 311NS: www.pecora.com.
 - c. Sika Corporation; Sikasil - 728 NS: www.usa.sika.com.
 - d. Tremco, Inc.; Spectrem 800: www.tremcosealants.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- C. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Type S, Uses NT, A, G, and O; mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Hardness Range: Comply with one of the following:
 - a. 15 to 35, Shore A, when tested in accordance with ASTM C661.
 - b. 25 to 35, Shore A, when tested in accordance with ASTM D2240.
 3. Color: Clear.
 4. Cure Type: Single-component, acetoxo or neutral moisture curing .
 5. Service Temperature Range: Minus 40 to 300 degrees F.
 6. Products:
 - a. Dow Corning; 786 Sealant M: www.dowcorning.com.
 - b. Momentive Performance Materials, Inc./GE; SCS1700 Sanitary: www.siliconeforbuilding.com.
 - c. Pecora Corporation; 898NST: www.pecora.com.
 - d. Sika Corporation; Sikasil - GP: www.usa.sika.com.
 - e. Tremco, Inc.; Tremsil 200 with fungicide: www.tremcosealants.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- D. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use. Siliconized.
1. Color: To be selected by Architect from manufacturer's full range.
 2. Grade: ASTM C834; Grade Minus 18 Degrees C (0 Degrees F).
 3. Products:
 - a. Franklin International Inc; Titebond Painter's Plus Caulk: www.titebond.com.

- b. Pecora Corporation; AC-20 +Silicone: www.pecora.com.
 - c. Sherwin Williams; 950A Siliconized Acrylic Latex Caulk: www.sherwin-williams.com.
 - d. Tremco, Inc.; Tremflex 834: www.tremcosealants.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- E. Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, non-sag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.
1. Color: To be selected by Architect from manufacturer's full range.
 2. Products:
 - a. Pecora Corporation; BA-98: www.pecora.com.
 - b. Tremco, Inc.; Acoustical/Curtainwall Sealant: www.tremcosealants.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SELF-LEVELING SEALANTS

- A. Self-Leveling Silicone Sealant: ASTM C920, Type S, Grade P, Uses T, M and O; single-component, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
 2. Hardness Range: Comply with one of the following:
 - a. 5 to 20, Shore A, when tested in accordance with ASTM C661.
 - b. 40 to 85, Shore 00, when tested in accordance with ASTM D2240.
 3. Color: To be selected by Architect from manufacturer's full range.
 4. Cure Type: Single-component, neutral moisture curing.
 5. Service Temperature Range: Minus 50 to 300 degrees F.
 6. Products:
 - a. Dow Corning; SL Parking Structure Sealant: www.siliconeforbuilding.com.
 - b. Pecora Corporation; 310SL: www.pecora.com.
 - c. Sika Corporation; Sikasil-728 SL: www.usa.sika.com.
 - d. Tremco, Inc.; Spectrem 900SL: www.tremcosealants.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
 3. Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

- A. Owner may employ an independent testing agency to perform field quality control inspection and testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.
- C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

SECTION 07 9513 - EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Expansion joint cover assemblies for floor, wall, and ceiling surfaces.
 - 1. Exterior expansion joint cover assemblies.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Placement of joint cover assembly frames in masonry.
- B. Section 07 9100 - Preformed Joint Seals: Sealing expansion and control joints using preformed joint seals.
- C. Section 07 9200 - Joint Sealants: Sealing expansion and control joints using gunnable and pourable sealants.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- D. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles 2020.
- E. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.
- F. ITS (DIR) - Directory of Listed Products current edition.
- G. UL (DIR) - Online Certifications Directory Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices, available colors and finish, and fire ratings.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction, anchorage locations, and fire ratings.
 - 1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work.
 - 2. Include transition and termination details.
- D. Expansion Joint Cover Assembly Schedule: Include the following information in tabular form:
 - 1. Manufacturer and model number for each expansion joint cover assembly.
 - 2. Expansion joint cover assembly location cross-referenced to Drawings.
 - 3. Nominal, minimum, and maximum joint width.
 - 4. Movement direction.
 - 5. Materials, colors, and finishes.
 - 6. Product options.
 - 7. Fire-resistance ratings.
- E. Samples: For each expansion joint cover assembly, submit three samples 6 inch long, illustrating profile, dimension, color, and finish selected.
- F. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.
- G. Field Quality Control: Submit field inspection reports.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum 5 years of documented experience and approved by manufacturer.

1.07 MOCK-UP

- A. Mock-ups: Build mock-ups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockup of each type of expansion joint cover assembly.
 - 2. Locate where directed by Architect.
 - 3. Mock-up may remain as part of the Work.

PART 2 PRODUCTS

2.01 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS - EXTERIORS

- A. Wall Joint Cover - Elastomeric Seal: Assembly consisting of elastomeric seal anchored to frames fixed to sides of joint gap.
 - 1. Application: Wall to wall and wall to corner.
 - 2. Exposed Metal: Aluminum.
 - 3. Seal: Preformed elastomeric membranes or extrusions.
 - 4. Nominal Joint Width: 2 inches.
 - 5. Minimum Joint Width: 1-1/2 inch.
 - 6. Maximum Joint Width: 3 inches.
 - 7. Fire Resistance Rating: Not less than that of adjacent construction.
 - 8. Secondary Moisture Barrier: Manufacturer's standard elastomeric moisture barrier.
 - 9. Finishes:
 - a. Aluminum: Fluorocarbon Painted. Color as selected by Architect from manufacturer' standards.
 - 10. Products: Construction Specialties, Inc. ASM-X Series: www.c-sgroup.com, or approved equivalent product of one of the following manufacturers:
 - a. Balco, Inc.: www.balcousa.com.
 - b. Inpro Corp.: www.inprocorp.com.
 - c. MM Systems Corp.: www.mmsystemcorp.com.
 - d. Nystrom: www.nystrom.com.
 - e. Watson Bowman Acme Corp./BASF Corp.: www.wbacorp.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLIES - GENERAL

- 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. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 2. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Provide factory fabricated corners, changes in direction, transitions, and terminations.
- C. Floor Joint Covers: Coordinate with indicated floor coverings.
- D. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.
- E. Covers In Gypsum Board Assemblies: Provide style with anchoring wings that can be completely covered by joint compound.
- F. Covers In Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
 - 1. Acceptable Evaluation Agencies: UL (DIR) and ITS (DIR).

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
- B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.
- C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.
- D. Secondary Moisture Barriers: Manufacturer's standard, continuous, moisture and vapor barrier membrane; within joint and attached to substrate on sides of joint.
- E. Anchors and Fasteners: As recommended by cover manufacturer.
- F. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- H. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

2.04 FINISHES

- A. Aluminum Finishes:
 - 1. High-Performance Organic Finish (Two-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: Conversion coating; Organic Coating: manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.
 - 2. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.02 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level.
- C. Rigidly anchor to substrate to prevent misalignment.
 - 1. At recessed floor joint assemblies, grout annular spaces between concrete slab and floor joint framing solid with nonshrink, nonmetallic grout; make flush with concrete floor slab.
- D. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.
 - 1. Ensure that fire-resistance rated expansion joint assemblies comply with performance requirements of tested assemblies.
- E. Secondary Moisture Barrier: Install continuous, uninterrupted barrier throughout length of joint, including transitions and field splices.
- F. Do not install final covers of expansion joint assemblies until internal components inspected by manufacturer's representative.

3.03 FIELD QUALITY CONTROL

- A. Provide manufacturer's representative to inspect installation of expansion joint cover assemblies, including internal fire barriers, secondary moisture barriers, transitions and terminations, and overall installation.
 - 1. Provide inspection reports.

3.04 PROTECTION

- A. Touch-up, repair, or replace damaged expansion joint assemblies before Date of Substantial Completion
- B. Do not permit traffic over unprotected floor joint surfaces.

END OF SECTION

SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
 - 1. Including fire-rated frames
- C. Fire-rated hollow metal doors and frames.
- D. Hollow metal borrowed lites glazing frames.

1.02 ABBREVIATIONS AND ACRONYMS

- A. ANSI: American National Standards Institute.
- B. BHMA - Builders Hardware Manufacturers Association.
- C. NFPA: National Fire Protection Association.
- D. SDI: Steel Door Institute.
- E. UL: Underwriters Laboratories.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames. 2003.
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2014.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2017.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable 2016.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2017.
- I. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- K. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- M. ITS (DIR) - Directory of Listed Products current edition.
- N. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.
- O. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- P. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2016.
- Q. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.
- R. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2013.
- S. UL (DIR) - Online Certifications Directory Current Edition.

- T. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- U. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
 - 1. Include details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
- D. Manufacturer's Qualification Statement.
- E. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ANSI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer warranty for doors and frames to be free from material or workmanship defects and within commercial tolerances within a 1 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.cecodoor.com.
 - 2. Curries, an Assa Abloy Group company: www.curries.com.
 - 3. De La Fontaine: www.delafontaine.com.
 - 4. Mesker/Mesker Openings Group, a Dormakaba Group company: www.meskeropeningsgroup.com.
 - 5. Pioneer Industries, an Assa Abloy Group company: www.pioneerindustries.com.
 - 6. Republic Doors, an Allegion brand: www.republicdoor.com.
 - 7. Steelcraft, an Allegion brand: www.allegion.com.
 - 8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
 - 4. Door Edge Profile: Beveled, both sides.

5. Typical Door Face Sheets: Flush.
6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
7. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115 and ANSI A250.8 (SDI-100) in accordance with specified requirements and as follows:
 - a. Minimum Hardware reinforcing thicknesses:
 - 1) Mortise Butt Hinges: 0.123 inches (10 gage),
 - 2) Pivot Hinges: 0.167 inches (7 gage)
 - 3) Continuous Hinges: 0.067 inches (14 gage).
 - 4) Exit Devices: 0.067 inches (14 gage)
 - 5) Mortise Locksets and Deadbolts: 0.067 inches (14 gage).
 - 6) Bored Locksets and Deadbolts: 0.067 inches (14 gage).
 - 7) Flush and Surface Bolts: 0.067 inches (14 gage).
 - 8) Closers and Hold Open Arms: 0.067 inches (14 gage).
 - 9) Pull Plates and Push/Pull Bars: 0.067 inches (14 gage).
 - 10) Protection Plates and Push Plates: No reinforcing required.
 8. Zinc Coating: Where indicated, provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M.
 - a. Minimum A60/ZF180 (galvannealed) coating unless otherwise indicated.
- B. Hollow Metal In-Fill Panels: Same construction, performance, and finish as doors.
- C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Interior Doors, Non-Fire Rated:
 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A 1 000 000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 3. Door Thickness: 1-3/4 inch, nominal.
- C. Fire-Rated Doors:
 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A 1 000 000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
 2. Fire Rating: As indicated on drawings, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 3. Temperature-Rise Rating (TRR) Across Door Thickness: 450 degrees F.
 - a. Provide where indicated on Drawings and at vertical exit enclosures and exit passageways.
 4. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - a. Attach fire rating label to each fire rated unit.

5. Smoke and Draft Control Doors: Install 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;
 - a. Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
 - b. Gasketing: Refer to Section 08 7100.
 - c. Label: Include the "S" label on fire-rating label of door.
6. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
7. Door Thickness: 1-3/4 inch, nominal.

2.04 HOLLOW METAL FRAMES

- A. Hollow metal frames based on SDI Standards: ANSI A250.8 (SDI-100).
 1. Joints between faces of abutting frame members shall appear seamless; joints shall be securely welded, filled, and and finished smooth without visible seams.
- B. Frame Finish: Factory primed and field finished.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 2. Includes frames for wood doors.
- D. Door Frames, Fire-Rated: Full profile/continuously welded type.
 1. Fire Rating: Same as door, labeled.
 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 3. Includes frames for wood doors.
- E. Borrowed Light Frames: Full profile/continuously welded type.
 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 2. Frame Finish: Factory primed and field finished.
 3. Face dimensions to match door frames.
- F. Mullions for Pairs of Doors: Where indicated provide fixed mullions with profile similar to jambs.
 1. Refer to Section 08 7100 - Door Hardware for removable mullions.
- G. Transom Bars: Fixed, of profile same as jamb and head.
- H. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- I. Frames in Masonry Walls: Size to suit masonry coursing with head member 2 inch high to fill opening without cutting masonry units.
- J. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
- K. Frame Anchors:
 1. Provide anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 2. Floor Anchors: Base anchors welded to bottom of frames, designed to attach frame to floor.
 3. Masonry Anchors: Masonry anchors shall be T-strap type, corrugated or perforated.
 4. Stud Anchors: Z-type, welded to back of frames.
 5. In-Place Concrete or Masonry Wall Anchors: Minimum 3/8 inch diameter bolts with expansion shields or inserts, with manufacturer's standard spacer.
 - a. For existing walls or new openings cut into existing walls

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Corrosion Resistant Back-Coating: Automotive undercoating, asphalt emulsion, or other high-build, water-resistant, resilient coating.

2.06 ACCESSORIES

- A. Glazing: As specified in Section 08 8000.
- B. Removable Stops: Formed sheet steel, mitered or butted corners; prepared for countersink style tamper proof screws.
 - 1. At Contractor's option, instead of glass stops provided by door manufacturer, provide fire rated glass manufacturer's standard vision lite kits for installing fire-rated glass in doors.
 - a. Refer to Section 08 8000 - Glazing.
- C. Astragals for Double Doors: Specified in Section 08 7100.
- D. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.
 - 1. Comply with requirements of Section 04 2000 - Unit Masonry.
- E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- F. Filler: Two-component, non-shrinking resin, autobody filler.
 - 1. Available Products:
 - a. 3M/Bondo; Professional Gold Body Filler: www.bondo.com.
- G. Mineral Fiber Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread and smoke developed indexes of 0 (zero) when tested in accordance with ASTM E84.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

- A. Back-Coating of Non-Rated Frames: Field-apply corrosion resistant back-coatings to frames that are to be grouted solid.
 - 1. Do not back-coat fire-rated frames.

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Install smoke control units in accordance with NFPA 105.
- D. Set frames accurately in position, aligned, plumb, and square.
- E. Fill head and jamb members with mineral fiber insulation prior to installation.
 - 1. Exception: Do not fill frames that are to be grouted solid.
- F. Grout frames solid in masonry and concrete construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
 - 1. Install silencers prior to grouting frames.
 - 2. Do not grout fire-rated frames; instead fill head and jamb members with mineral fiber insulation.
- G. Frame Anchors:
 - 1. Coordinate frame anchor placement with wall construction.
 - 2. Minimum number of anchors:
 - a. Provide 3 jamb anchors per jamb up to 90 inches in height; evenly spaced.
 - b. Provide 4 jamb anchors per jamb from 90 to 144 inches in height; evenly spaced.
 - c. Provide 1 additional anchor per jamb for each 24 inches or fraction thereof more than 144 inches in height.

- d. Provide 1 floor anchor at the bottom of each jamb or mullion; where a floor anchor is not possible provide one additional jamb anchor.
 - 3. In-Place Concrete or Masonry Wall Anchor: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - H. Install doors plumb with uniform clearance at jambs and head; doors shall open and close without binding
 - I. Install glass in accordance with Section 08 8000 - Glazing.
 - J. Install door hardware as specified in Section 08 7100.
 - K. Coordinate installation of electrical connections to electrical hardware items.
- 3.04 **TOLERANCES**
- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117.
 - B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.
- 3.05 **ADJUSTING**
- A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 1116 - ALUMINUM DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush aluminum doors with aluminum face sheets.
- B. Aluminum monumental stile and rail doors.

1.02 REFERENCE STANDARDS

- A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- C. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals 2011.
- D. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- E. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- H. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- K. 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).
- L. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.
- M. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature for each type of door and frame; include information on fabrication methods, hardware preparation, accessories, installation, and maintenance instructions.
- C. Shop Drawings: Include elevations of each opening type and details at each wall type.
 - 1. Include details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
- D. Verification Samples: Three actual pieces of products in each finish specified, not less than 6 inches square or 6 inches long for linear components.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than five years of documented experience.

- B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver aluminum components in manufacturer's standard protective packaging, palletted, crated, or banded together.
- B. Inspect delivered components for damage and replace. Repaired components will not be accepted.
- C. Store components in clean, dry, indoor area, under cover in manufacturer's packaging until installation.
- D. Protect materials and finish from damage during handling and installation.

1.06 FIELD CONDITIONS

- A. Do not begin installation of interior aluminum components until space has been enclosed and ambient thermal conditions are being maintained at levels consistent with final project requirements.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for defects in workmanship and materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Flush Aluminum Doors with Aluminum Face Sheets:
 - 1. Arcadia, Inc: www.arcadiainc.com/#sle.
 - 2. Cline Aluminum Doors, Inc; Series 100BE: www.clinedoors.com/#sle.
 - 3. Special-Lite, Inc; SL-16: www.special-lite.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Aluminum Monumental Stile and Rail Doors:

2.02 DOORS AND FRAMES

- A. Accessibility: Comply with ICC A117.1 and ADA Standards.
- B. Flush Aluminum Doors with Aluminum Face Sheets: Aluminum internal framing and faces; no steel components.
 - 1. Thickness: 1-3/4 inches, nominal.
 - 2. Facing: Seamless aluminum sheet, 0.062 inch, fluted texture, laminated to foam panel core.
 - 3. Finish: High performance organic coating.
 - 4. Weatherstripping: Replaceable pile type; at jambs and head of exterior doors.
- C. Aluminum Monumental Stile and Rail Doors: Extruded aluminum, alloy 6063-T6 temper, with 1/8 inch minimum wall thickness, with mid-rail, and having full width galvanized steel 3/8 inch tie rods within top and bottom rails.
 - 1. Thickness: 1-3/4 inches, nominal.
 - 2. Top Rail Height: 6-1/2 inches, nominal.
 - 3. Mid-Rail Height: 6-1/2 inch, nominal.
 - 4. Finish: Class I - Natural anodized.
- D. Aluminum Frames for Doors: Extruded aluminum, thermally broken hollow or C-shaped sections; no steel components.
 - 1. Frame Depth: To fit wall thicknesses as indicated on Drawings.
 - 2. Face Trim Profile: 2 inches; snap-on trim.
 - 3. Extruded aluminum shapes, not less than 0.062 inch thick.
 - 4. Provide manufacturer's standard aluminum and steel reinforcements for door hardware; 1/8 inch minimum thickness.
 - 5. Trim: Extruded aluminum, not less than 0.062 inch thick, removable snap-in type without exposed fasteners.

6. Finish: Same as doors.
7. Weatherstripping: Replaceable pile type; at jambs and head.
- E. Dimensions and Shapes: As indicated on Drawings; dimensions indicated are nominal.
 1. Provide the following clearances:
 - a. Hinge and Lock Stiles: 1/8 inch.
 - b. Between Meeting Stiles: 1/4 inch.
 - c. At Top Rail and Bottom Rail: 1/8 inch.

2.03 PERFORMANCE REQUIREMENTS

- A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
- B. Factory install door hardware to the greatest extent possible.
- C. Air Leakage: Maximum of 0.1 cu ft/min/sq ft at 6.27 psf differential pressure, when tested in accordance with ASTM E283.
- D. Overall U-value, Including Glazing: 0.35, minimum, measured on exterior door size required for this project.

2.04 MATERIALS

- A. Aluminum Sheet: ASTM B209 (ASTM B209M), alloy 5005, temper H14, stretcher leveled.
- B. Extruded Aluminum: ASTM B221 (ASTM B221M), alloy 6063, temper T5, or alloy 6463, temper T5.

2.05 FINISHES

- A. Class I Natural Anodized Finish: Clear anodic coating; AAMA 611 AA-M12C22A41, minimum dry film thickness (DFT) of 0.7 mils, 0.0007 inch.
- B. Pigmented Organic Coatings: Polyester or acrylic baked enamel finish with minimum dry film thickness (DFT) of 0.8 mils, 0.0008 inch over aluminum extrusions and panels; AAMA 2603.
 1. Color: To match Architect's sample.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.06 ACCESSORIES

- A. Replaceable Weatherstripping: AAMA 701/702 wool pile.
- B. Fasteners: Aluminum, non-magnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.
 1. Provide concealed fasteners where possible.
 2. Exposed fasteners shall match finish of doors and frames.
- C. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible, otherwise, non-magnetic stainless steel or steel hot-dip galvanized in compliance with ASTM A123/A123M.
- D. Bituminous Coating: Cold-applied asphaltic mastic, compounded for 30-mil thickness per coat.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall surfaces and openings are ready to receive frames and are within tolerances specified in manufacturer's instructions.
- B. Verify that frames installed by other trades for installation of doors of this section are in strict accordance with recommendations and approved shop drawings and within tolerances specified in manufacturer's instructions.

3.02 PREPARATION

- A. Perform cutting, fitting, forming, drilling, and grinding of frames as required for project conditions.
- B. Replace components with damage to exposed finishes.
- C. Separate dissimilar metals to prevent electrolytic action between metals.

3.03 **INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and approved shop drawings.
- B. Install exterior doors and frames in accordance with ASTM E2112.
- C. Set frames plumb, square, level, and aligned to receive doors. Anchor frames to adjacent construction in strict accordance with manufacturer's recommendations and within specified tolerances.
- D. Where aluminum surfaces contact metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact by painting dissimilar metal with heavy coating of bituminous paint.
- E. Hang doors and adjust hardware to achieve specified clearances and proper door operation.
- F. Install door hardware as specified in Section 08 7100.
- G. Coordinate installation of electrical connections to electrical hardware items.

3.04 **TOLERANCES**

- A. Tolerances: Install framing systems in accordance with the following tolerances:
 - 1. Variation from Plane: Do not exceed 1/8 inch in 12 feet of length or 1/4 inch in any total length.
 - 2. Offset from Alignment: Maximum offset from true alignment between 2 identical members abutting end to end in line shall not exceed 1/16 inch.
 - 3. Diagonal Measurements: Maximum difference in diagonal measurements shall not exceed 1/8 inch.
 - 4. Offset at Corners: Maximum out-of-plane offset of framing at corners shall not exceed 1/32 inch.

3.05 **CLEANING**

- A. Upon completion of installation, thoroughly clean door and frame surfaces in accordance with AAMA 609 & 610.
- B. Do not use abrasive, caustic, or acid cleaning agents.

3.06 **PROTECTION**

- A. Protect products of this section from damage caused by subsequent construction until Date of Substantial Completion.
- B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush and flush glazed configuration; fire-rated and non-rated.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 - Glazing.
- D. Section 09 2116 - Gypsum Board Assemblies: Sheathing and wallboard for partitions and walls.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).
- B. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2016.
- C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- D. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2016.
- E. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- F. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. 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.
 - 1. Provide information as required by AWI/AWMAC/WI (AWS).
 - 2. Include details of electrical raceway and preparation for electrified hardware, access control systems, and security systems
- D. Samples: Submit three samples of door veneer, 8 by 10 inch in size illustrating wood grain, stain color, and sheen.
 - 1. Transparent finish Samples shall illustrate typical range of wood color and grain.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than 5 years of documented experience.

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. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Eggers Industries, acquired by VT Industries, Inc. : www.eggersindustries.com.
 - 2. Graham Wood Doors; Masonite Architectural: www.graham-maiman.masonite.com.
 - 3. Marshfield-Algoma, Masonite Architectural: <https://architectural.masonite.com>.
 - 4. Mohawk Doors, Masonite Architectural: <https://architectural.masonite.com>.
 - 5. Oshkosh Door Company: www.oshkoshdoor.com
 - 6. VT Industries, Inc.; www.vtindustries.com
 - 7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

- A. Doors: Refer to drawings for locations and additional requirements.
 - 1. Quality Standard: Premium Grade, Extra Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
 - 3. Smoke and Draft Control Doors: In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft of door opening at 0.10 inch wg pressure at both ambient and elevated temperatures for "S" label.
 - 4. Wood veneer facing with factory transparent finish.

2.03 DOOR CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish:
 - 1. Species and Cut:
 - a. Species: Select White Maple.
 - b. Cut: Plain sliced (flat cut).
 - c. Grade: HPVA Grade AA.
 - 2. Veneer Matching:
 - a. Matching of Adjacent Veneer Leaves: Book match.
 - b. Matching Within Door Faces: Center balance match.
 - 3. Vertical Edges: Same species as face veneer.
 - 4. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
- B. Veneer Facing for Opaque Finish: Closed grain hardwood veneer, in compliance with indicated quality standard.
- C. Facing Adhesive: Type II - water resistant.

2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- F. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System 5 - Conversion Varnish, System 10 - UV Curable Water-based, or System 11 - Catalyzed Polyurethane.
 - b. Stain: As selected by Architect.
 - c. Sheen: Satin.
 - B. Seal door top edge with color sealer to match door facing.

2.07 ACCESSORIES

- A. Hollow Metal Door Frames: As specified in Section 08 1113 - Hollow Metal Doors and Frames.
- B. Glazing: As specified in Section 08 8000.
- C. Glazing Stops:
 - 1. Non-Rated Doors: Wood, of same species as door facing, mitered corners; prepared for countersink style tamper proof screws.
 - a. Type: Flush moldings.
 - 2. Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces, prepared for countersink style tamper proof screws.
 - a. Type: Lipped moldings.
 - b. At Contractor's option, instead of glass stops provided by door manufacturer, provide fire rated glass manufacturer's standard vision lite kits for installing fire-rated glass in doors.
 - 1) Refer to Section 08 8000 - Glazing.
- D. Door Hardware: As specified in Section 08 7100.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

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. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

- E. Coordinate installation of glazing.
- F. Install door louvers plumb and level.
- G. Install glass in accordance with Section 08 8000 - Glazing.
- H. Install door hardware as specified in Section 08 7100 - Door Hardware.
- I. Coordinate installation of electrical connections to electrical hardware items.

3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION

SECTION 08 1613 - FIBERGLASS DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass doors.
- B. Fiberglass door frames.

1.02 RELATED REQUIREMENTS

- A. Section 08 4313 Aluminum Framed Storefronts: Aluminum frames.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.
- B. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics 2010 (Reapproved 2018).
- C. ASTM D570 - Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).
- D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2018.
- E. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2014.
- F. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials 2017.
- G. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor 2013a.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- I. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.
- J. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. ITS (DIR) - Directory of Listed Products current edition.
- L. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- M. UL (DIR) - Online Certifications Directory Current Edition.
- N. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.
- C. Shop Drawings: Indicate layout and profiles; include assembly methods.
 - 1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
 - 2. Indicate wall conditions, door and frame elevations, sections, materials, gages, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.

- D. Verification Samples: Submit door surface samples for each finish specified, 10 inches by 10 inches in size, illustrating finishes, colors, and textures.
- E. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Maintenance Data: Include instructions for repair of minor scratches and damage.
- I. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
 - 1. Store at temperature and humidity conditions recommended by manufacturer.
 - 2. Do not use non-vented plastic or canvas shelters.
 - 3. Immediately remove wet wrappers.
- C. Store in position recommended by manufacturer, elevated minimum 4 inches above grade, with minimum 1/4 inch space between doors.

1.08 FIELD CONDITIONS

- A. Do not install doors until structure is enclosed.
- B. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide ten (10) year manufacturer warranty covering materials and workmanship, including degradation or failure due to chemical contact.
- C. Provide 25 year warranty on fiberglass reinforced plastic (FRP) face sheets covering delamination, bubbling, and panel corrosion.
- D. Provide 20 year warranty on aluminum finishes in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, chalking, peeling, or failure of paint to adhere to bare metal.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fiberglass Composite Doors:
 - 1. Special-Lite, Inc; SL-20 FRP/Aluminum Hybrid Doors: www.special-lite.com/#sle.
 - 2. Vale FRP Doors: www.valedoors.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Fire-Rated Fiberglass Doors and Frames:

1. Special-Lite, Inc; AF-FR Series: www.special-lite.com/#sle.
2. Vale FRP Doors: www.valedoors.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOOR AND FRAME ASSEMBLIES

- A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
1. Physical Endurance: Swinging door cycle test to ANSI/SDI A250.4, Level A (1,000,000 cycles) minimum; tested with hardware and fasteners intended for use on project.
 2. Screw-Holding Capacity: Tested to 890 pounds, minimum.
 3. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
 4. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
 5. Chemical Resistance: Resist degradation due to exposure to tap water and distilled water.
 - a. Chlorine-treated moisture in air.
 6. Sizes: As indicated on drawings.
 7. Clearance Between Door and Frame: 1/8 inch, maximum.
 8. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4 inch clearance to threshold.
- B. Fire-Rated Doors and Frames: Comply with fire-ratings as indicated on drawings.
1. Tested in accordance with ICC (IBC) for positive pressure or UL 10C.
 2. ITS (DIR) or UL (DIR) listed and labeled.
 3. Visible seals when doors are open or closed is not permitted.
 4. Provide mineral fiber or intumescent core as required for fire-rating as indicated.

2.03 COMPONENTS

- A. Doors: Fiberglass construction with reinforced core.
1. Thickness: 1-3/4 inch, nominal.
 2. Core Material: Manufacturer's standard core material for application indicated.
 3. Construction:
 - a. Fiberglass ultraviolet resistant mylar coated, with 1/8 inch thick through color face sheets laminated to core.
 4. Face Sheet Texture: Sandstone.
 5. Door Panel: As indicated on drawings.
 6. Subframe and Reinforcements: Manufacturer's standard materials.
 7. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations of fiberglass reinforced plastic (FRP); provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
 8. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide solid blocking for each item; field cutting, drilling or tapping is not permitted; obtain manufacturer's hardware templates for preparation as necessary.
- B. Door Frames: Provide type in compliance with performance requirements specified for doors.
1. Type: Factory assembled with chemically welded joints.
 2. Profiles: 5-3/4 inches deep, 2 inches wide at jambs, and 2 inches wide at headers.
 3. Door Stop: 5/8 inch wide, by 1-7/8 inches deep.
 4. Non-Fire-Rated:
 - a. Aluminum, 0.04 inch minimum wall thickness; natural anodized finish.
 5. Fire-Rated: Provide frames bearing labels to match doors.
 - a. Fiberglass pultrusions to match door finish.
 6. Corner Joints: Mitered with concealed corner blocks or angles of same material as frame; fiberglass and aluminum joined with screws; steel and stainless steel spot welded; sealed watertight with silicone sealant.
 7. Frame Anchors: Stainless steel, Type 304; provide three anchors in each jamb for heights up to 84 inches with one additional anchor for each additional 24 inches in height.

8. Reinforcing: Provide manufacturer's standard reinforcing at hinge, strike, and closer locations.

2.04 PERFORMANCE REQUIREMENTS

- A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
- B. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties:
 1. Izod Impact Resistance: ASTM D256, 7 foot-pound force per inch of width, minimum, with notched izod.
 2. Tensile Strength at Break: ASTM D638, 13,250 psi, minimum.
 3. Water Absorption: ASTM D570, 0.16 percent, maximum, after 24 hours at 74 degrees F.
 4. Flexural Strength: ASTM D790, 27,000 psi, minimum.
 5. Barcol Hardness: ASTM D2583, minimum of 40 units.

2.05 FINISHES

- A. Painted: Two-part aliphatic polyurethane, low VOC industrial coating.
 1. Thickness: Minimum 5 mils, 0.005 inch wet thickness.
 2. Color: As selected by Architect from manufacturer's custom line of colors.
- B. Abuse resistant engineered surface with protective coating and through-molded color.
 1. Panel Texture: Sandstone.
 2. Color: As selected by Architect from manufacturer's full line of colors.

2.06 ACCESSORIES

- A. Stops for Glazing and Louver: Fiberglass, unless otherwise indicated or required by fire rating; provided by door manufacturer to fit factory made openings, with color and texture to match door; fasteners shall maintain waterproof integrity.
 1. Exterior Doors: Provide non-removable stops on exterior side with continuous compression gasket weatherseal.
 2. Glazed Openings: Provide removable stops on interior side.
 3. Opening Sizes and Shapes: As indicated on drawings.
- B. Glazing: See Section 08 8000.
- C. Astragals and Edges for Double Doors: Pairs of doors astragals, and door edge sealing and protection devices.
 1. Provide surface mounted astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.
 2. Astragal Type: Split, two parts, and with automatic locking, cutouts for other door hardware, and sealing gasket.
 3. Edge Type: L-shaped lock edge protector, square
 4. Material: Aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

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. Clean and prepare substrate in accordance with manufacturer's directions.
- C. Protect adjacent work and finish surfaces from damage during installation.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
- B. Install fire-rated assemblies in accordance with NFPA 80.
- C. Install exterior doors in accordance with ASTM E2112.
- D. Install door hardware as specified in Section 08 7100.
- E. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.
- F. Set thresholds in continuous bed of sealant.
- G. In masonry walls, install frames prior to laying masonry; anchor frames into masonry mortar joints; fill jambs with grout as walls are laid up.
- H. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.
- I. Repair or replace damaged installed products.

3.04 ADJUSTING

- A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
- B. Adjust hardware for smooth and quiet operation.
- C. Adjust doors to fit snugly and close without sticking or binding.

3.05 CLEANING

- A. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

3.06 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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SECTION 08 1700 - INTEGRATED DOOR OPENING ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Integrated metal door opening assemblies, including, but not limited to, doors, frames, door hardware, and accessories for a complete fire-rated assembly.
 - 1. Cross corridor doors.
 - a. Pair application with door pockets.

1.02 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware: Door hardware submittal requirements.
- B. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2014.
- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
- D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable 2016.
- E. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2017.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2017.
- G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- I. BHMA A156.3 - American National Standard for Exit Devices 2014.
- J. BHMA A156.4 - American National Standard for Door Controls - Closers 2013.
- K. BHMA A156.15 - American National Standard for Release Devices - Closer Holder, Electromagnetic and Electromechanical 2015.
- L. BHMA A156.18 - American National Standard for Materials and Finishes 2016.
- M. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems Sponsor 2017.
- N. BHMA A156.26 - American National Standard for Continuous Hinges 2017.
- O. BHMA A156.32 - American National Standard for Integrated Door Opening Assemblies 2014.
- P. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- Q. ITS (DIR) - Directory of Listed Products current edition.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- S. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2016.
- T. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.
- U. UL (DIR) - Online Certifications Directory Current Edition.
- V. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.

- B. Product Data: Materials and details of design and construction, door hardware, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Indicate details of each opening showing elevations, glazing, frame profiles, hardware, and different finish locations, if any.
 - 1. Include details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
- D. Samples: Submit three samples of exposed door finish materials, 2 by 2 inches in size, showing factory finishes and colors as selected.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with minimum 5 years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver units preassembled and prefinished, with door hardware mounted and functioning, and packaged to protect contents from damage.
- B. Store in a clean, dry, and ventilated space having controlled temperature and relative humidity between 30 and 60 percent and in accordance with manufacturer's written instructions.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's standard warranty against defects in material and workmanship:
 - 1. For entire door opening assembly, provide two year warranty period after Date of Substantial Completion.
 - 2. Exit Devices and Locksets: Provide lifetime warranty against defects in materials and workmanship.
 - 3. Warranty shall be void unless units are stored in accordance with manufacturer's instructions prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design - Integrated Door Opening Assemblies:
 - 1. Total Door Systems: www.totaldoor.com
- B. Other Acceptable Integrated Door Opening Assemblies Manufacturers:
 - 1. Adams Rite - The Rite Door, an Assa Abloy Group company: www.ritedoor.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ASSEMBLIES

- A. Door, Frame, and Hardware Assemblies: Provide fully functional, factory-assembled and factory-finished door opening units, complete with door, frame, and hardware; complying with BHMA A156.32 and specified requirements.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 2. Masonry Wall Frames: Size to suit masonry coursing with head frame member 4 inch high to fill opening without cutting masonry units.
- B. Applications:
 - 1. Door opening assemblies include cross corridor as indicated on drawings.
 - a. Provide double door openings as indicated on drawings.

2.03 PERFORMANCE REQUIREMENTS

- A. Comply with requirements of local building code and authorities having jurisdiction, and the following:
 - 1. Force to Open Interior Swinging Egress Doors, Non-Fire Doors: Not more than 5 pounds.
 - 2. Force to Release Latch for Other Swinging Doors: Not more than 15 pounds to release latch, not more than 30 pounds to set door in motion, and not more than 15 pounds to swing door to full open position.
 - 3. Fire-Rated Doors: Comply with NFPA 80 and NFPA 252.
 - a. Hourly Fire-Rating: As indicated on drawings.
 - 4. 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 same or greater than fire-rated doors, and the following;
 - a. Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
 - b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
 - c. Label: Include the "S" label on fire-rating label of door in compliance with NFPA 80.
 - 5. Temperature Rise Across Fire Doors in Interior Exit Passageways and elsewhere as indicated on Drawings: Maximum of 450 degrees F above ambient at end of 30 minutes standard fire test exposure.
 - 6. Provide fire-rated units listed and labeled by UL (DIR) or ITS (DIR).
 - a. Attach fire rating label to each fire-rated unit in compliance with NFPA 80.
- B. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- C. Electromagnetic Door Holders: Connect with building fire alarm and smoke detection systems; upon activation of fire alarm, holders shall release allowing doors to close.

2.04 COMPONENTS.

- A. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
- B. Hollow Metal Doors: Doors complying with ANSI/SDI A250.8 construction requirements exceeding Level 3 and Physical Performance Level A, Model 1 - Full Flush; electrogalvanized prior to finishing; manufacturer's standard core and reinforcements.
 - 1. Door Thickness: 1-3/4 inches.
 - 2. Fire-Rated Doors: 16 gage, 0.053 inch thick faces and edges.
 - 3. Other Non-Fire-Rated Interior Doors: 16 gage, 0.053 inch thick faces and edges.
- C. Hollow Metal Door Frames: Formed steel cased opening complying with ANSI/SDI A250.8 construction requirements exceeding Level 3 and Physical Performance Level A; electrogalvanized prior to finishing.
 - 1. Type: Full profile welded, 16 gage, 0.053 inch, primed for field finishing.
 - 2. Provide frame anchors for secure installation and to comply with opening performance requirements.
- D. Frame Anchors:
 - 1. Provide anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 2. Floor Anchors: Base anchors welded to bottom of frames, designed to attach frame to floor.
 - 3. Masonry Anchors: Masonry anchors shall be T-strap type, corrugated or perforated.
 - 4. Stud Anchors: Z-type, welded to back of frames.

2.05 DOOR HARDWARE

- A. Manufacturers: Door hardware manufacturers are as determined by manufacturer of Integrated Door Opening Assemblies in compliance with BHMA A156.32 requirements for applications indicated.
- B. Continuous Hinges: Full height; complying with BHMA A156.26, Grade 1.
 - 1. Type: Pin and barrel design unless specified otherwise.
 - 2. Base Metal: Steel.
 - 3. Basis of Design:
 - a. Total Door Systems; H-13 Series: www.totaldoor.com.
 - 4. Other Acceptable Products:
 - a. Adams Rite - The Rite Door, an Assa Abloy Group company ; D200 Series: www.ritedoor.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Concealed Pocket Door Closers: Provide concealed wall mounted pocket door closer with cover, 180 degree swing, positive stop, adjustable sizing, latching, and closing speed; complying with BHMA A156.4, Grade 1.
 - 1. Normally Open Doors: Provide concealed closer and arm, when door is open.
 - 2. Basis of Design:
 - a. Total Door Systems; TDC96P Concealed Closer: www.totaldoor.com.
 - 3. Other Acceptable Products:
 - a. Adams Rite - The Rite Door, an Assa Abloy Group company; Institutional Door Closer D-DCN-7706STP: www.ritedoor.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Flush Panic Exit Devices: Provide flush panel exit device, recessed into door; extruded aluminum; complying with BHMA A156.3, Grade 1.
 - 1. Projection From Face of Door - Push Side: Maximum of 5/8 inch.
 - 2. Pull Trim: Provide lever handle trim to operate locksets or latchsets; rectangular escutcheon with lever trim style to match style specified in Section 08 7100 Door Hardware.
 - 3. Basis of Design:
 - a. Total Door Systems; PF200 Flush Panic Exit Device: www.totaldoor.com
 - 4. Other Acceptable Products:
 - a. Adams Rite - The Rite Door, an Assa Abloy Group company ; D3676-D3080-MEC Exit Device: www.ritedoor.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Electromagnetic Door Holders: Complying with BHMA A156.15.
 - 1. Holding Force: 35 pound-force.
 - 2. Voltage: 24 VDC.
 - 3. Basis of Design:
 - a. Total Door Systems; TDH 200 Model: www.totaldoor.com.
 - 4. Other Acceptable Products:
 - a. Adams Rite - The Rite Door, an Assa Abloy Group company ; Model D-MDH-210: www.ritedoor.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- F. Gasketing: Manufacturer's standard gasketing complying with BHMA A156.22, and as follows:
 - 1. Locations: Fire-rated and smoke-rated doors.
 - 2. Head and Jamb Type: Self-adhesive.
 - 3. Astragal at Door Pairs: Manufacturer's standard astragal assembly.
 - a. Basis of Design:
 - 1) Total Door Systems; L-11 Latching Channel System: www.totaldoor.com.
 - b. Other Acceptable Manufacturers: Provide a comparable product from one of the following:

- 1) Adams Rite - The Rite Door, an Assa Abloy Group company: www.ritedoor.com.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
4. Door Sweep Type: Factory mortised concealed sweep.
- a. Material: Aluminum, with brush weatherstripping.
 - b. Provide only if required by local codes.
- G. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

2.06 FINISHES

- A. Doors and Frames:
1. Primed Frames: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
 2. Primed Doors: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Door Hardware: Provide door hardware of same finish, unless otherwise indicated.
1. Finish: To match finishes in Section 08 7100 - Door Hardware; BHMA A156.18.

2.07 ACCESSORIES

- A. Mineral Fiber Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread and smoke developed indexes of 0 (zero) when tested in accordance with ASTM E84

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting this Work.
- B. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's requirements and the specified performance requirements.
- B. Install fire rated units in accordance with NFPA 80.
- C. Install smoke and draft control doors in accordance with NFPA 105.
- D. Fill head and jamb members with mineral fiber insulation prior to installation.
- E. Set frames accurately in position, aligned, plumb, and square.
- F. Frame Anchors:
 1. Coordinate frame anchor placement with wall construction.
 2. Minimum number of anchors:
 - a. Provide 3 jamb anchors per jamb up to 90 inches in height; evenly spaced.
 - b. Provide 1 floor anchor at the bottom of each jamb or mullion; where a floor anchor is not possible provide one additional jamb anchor.
- G. Coordinate installation of electrical connections to electrical hardware items.

3.03 TOLERANCES

- A. Clearances Between Door and Frame: As specified in ANSI/SDI A250.8.
- B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.

END OF SECTION

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SECTION 08 3100 - ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall and ceiling mounted access units.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000: Openings in masonry.
- B. Section 09 2216: Openings in partitions.
- C. Section 09 2216: Openings in ceilings.
- D. Section 09 9100: Painting: Field paint finish.

1.03 DEFINITIONS

- A. Wet Areas: Includes the following:
 - 1. Exterior locations.
 - 2. Showers.
 - 3. Swimming pool areas.
 - 4. Other areas as indicated.
- B. Non-Wet Areas: Areas that are not indicated or listed as wet areas including, but not limited to, the following:
 - 1. Kitchens.
 - 2. Laundry areas.
 - 3. Locker rooms.
 - 4. Toilet rooms.
 - 5. Janitor closets.

1.04 REFERENCE STANDARDS

- A. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable 2016.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2017.
- C. ITS (DIR) - Directory of Listed Products current edition.
- D. UL (FRD) - Fire Resistance Directory Current Edition.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Project Record Documents: Record actual locations of each access unit.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel: Sheet complying with the following:
 - 1. All areas except wet areas: ASTM A1008/A1008M.
 - 2. Wet areas: ASTM A653/A653M Grade 33; A40 galvannealed.

2.02 WALL AND CEILING MOUNTED ACCESS UNITS

- A. Manufacturers:
 - 1. Activar Construction Products Group - JL Industries: www.activarcpg.com.

2. ACUDOR Products Inc: www.acudor.com
 3. Babcock-Davis: www.babcockdavis.com/#sle.
 4. Karp Associates, Inc: www.karpinc.com.
 5. Larsen's Manufacturing Company: www.larsenmfg.com.
 6. MIFAB, Inc: www.mifab.com.
 7. Milcor, Inc: www.milcorinc.com.
 8. Nystrom, Inc: www.nystrom.com.
 9. Substitutions: See Section 01 6000 - Product Requirements.
- B. General:
1. Factory fabricate doors and frames.
 2. Fully assemble units with corner joints welded, filled and ground flush; square and without rack or warp.
 3. Coordinate requirements with type of installation assembly being used for each unit.
- C. Flush Access Doors with Exposed Flanges:
1. Locations: Masonry.
 2. Material: Steel.
 3. Style: Exposed frame with door surface flush with frame surface.
 - a. Masonry Mounting Criteria: Provide masonry anchor straps.
 4. Door Style: Single thickness with rolled or turned in edges.
 5. Doors: 14 gage, 0.0747 inch, minimum thickness.
 6. Frames: 16 gage, 0.0598 inch, minimum thickness.
 7. Steel Finish: Primed; manufacturer's standard rust-inhibitive powder coat.
 8. Door/Panel Size: As indicated on the drawings.
 9. Hardware:
 - a. Hinges: Concealed, constant force closure spring type.
 - b. Handle: No handle.
 - c. Latch/Lock: Screw driver slot for quarter turn cam latch.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
- D. Flush Access Doors with Concealed Flanges:
1. Locations: Gypsum board.
 2. Material: Steel.
 3. Style: Concealed flange for drywall.
 - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
 4. Door Style: Single thickness with rolled or turned in edges.
 5. Doors: 14 gage, 0.0747 inch, minimum thickness
 6. Frames: 16 gage, 0.0598 inch, minimum thickness.
 7. Steel Finish: Primed; manufacturer's standard rust-inhibitive powder coat.
 8. Door/Panel Size: As indicated on the drawings.
 9. Hardware:
 - a. Hinges: Concealed, constant force closure spring type.
 - b. Handle: No handle.
 - c. Latch/Lock: Screw driver slot for quarter turn cam latch.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
- E. Fire-Rated, Flush, Uninsulated, Access Doors with Exposed Flanges:
1. Locations: Masonry.
 2. Material: Steel.
 3. Style: Exposed frame with door surface flush with frame surface.
 - a. Masonry Mounting Criteria: Provide masonry anchor straps.
 4. Door Style: Single thickness with rolled or turned in edges.
 5. Doors: 16 gage, 0.0598 inch, minimum thickness
 6. Frames: 16 gage, 0.0598 inch, minimum thickness.

7. Fire-Rating: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
 - a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
 8. Steel Finish: Primed; manufacturer's standard rust-inhibitive powder coat.
 9. Door/Panel Size: As indicated on the drawings.
 10. Hardware: Automatic closing, self-latching, with interior latch release.
 - a. Hinges: Exposed, continuous piano hinge.
 - b. Handle: No handle.
 - c. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
 - e. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.
- F. Fire-Rated, Flush, Uninsulated, Access Doors with Concealed Flanges:
1. Locations: Gypsum board.
 2. Material: Steel.
 3. Style: Concealed flange for drywall.
 - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
 4. Door Style: Single thickness with rolled or turned in edges.
 5. Doors: 16 gage, 0.0598 inch, minimum thickness
 6. Frames: 16 gage, 0.0598 inch, minimum thickness.
 7. Fire-Rating: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
 - a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
 8. Steel Finish: Primed; manufacturer's standard rust-inhibitive powder coat.
 9. Door/Panel Size: As indicated on the drawings.
 10. Hardware: Automatic closing, self-latching, with interior latch release.
 - a. Hinges: Exposed continuous piano hinge.
 - b. Handle: No handle.
 - c. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
 - e. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 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.

3.04 ADJUSTING

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

END OF SECTION

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SECTION 08 3323 - OVERHEAD COILING DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Overhead coiling doors and shutters.
 - 1. Non-fire-rated and fire-rated doors.
 - 2. Interior and exterior doors.
 - 3. Motorized operation.

1.02 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2017.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- E. ITS (DIR) - Directory of Listed Products current edition.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2018.
- G. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts 2000, with Errata (2008).
- H. NEMA MG 1 - Motors and Generators 2018.
- I. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- K. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2016.
- L. UL (DIR) - Online Certifications Directory Current Edition.
- M. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.
- N. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, electrical equipment, and component connections and details.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include diagrams for power, signal, and control wiring.
- D. Samples: Submit three slats, 6 inches long in size illustrating shape, color and finish texture.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Field Quality Control: Submit field inspection reports.
- H. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least 5 years documented experience and approved by manufacturer.

- C. 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.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Provide two year manufacturer warranty for defects in workmanship and materials from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Overhead Coiling Doors - Basis of Design: The design for each coiling door specified is based on the product named. Provide either the named product or a comparable product by one of the following:
1. C.H.I. Overhead Doors; www.chiohd.com.
 2. Clopay Building Products: www.clopaydoor.com.
 3. CornellCookson, Inc.; www.cornelliron.com.
 4. McKeon Door Company; www.mckeondoors.com.
 5. Overhead Door Corp.; www.overheaddoor.com.
 6. Raynor Door: www.raynor.com.
 7. Wayne-Dalton; www.wayne-dalton.com.
 8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COILING DOORS

- A. Exterior Coiling Doors: Aluminum slat curtain.
1. Basis of Design Product: Overhead Door Corp.; Model 625; www.overheaddoor.com.
 2. Capable of withstanding positive and negative wind loads of 20 psf, without undue deflection or damage to components.
 3. Operation Cycles: Door components and operators capable of operating for not less than 20,000 cycles.
 - a. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
 4. Sandwich slat construction with insulated core of foamed-in-place polyurethane insulation; minimum R-value of 7.5. Galvanized steel.
 5. Nominal Slat Size: 2-1/2 inches wide x required length.
 6. Finish: Anodized, clear aluminum color.
 7. Guide, Angles: Primed steel.
 8. Bottom Bar or Angles: Galvanized steel.
 9. Hood Enclosure: Manufacturer's standard; galvanized steel.
 10. Electric operation.
 11. Mounting: Surface mounted unless otherwise indicated on Drawings.
- B. Non-Fire-Rated Interior Coiling Doors: Stainless steel slat curtain.
1. Basis of Design Product: Overhead Door Corp.; Model 610; www.overheaddoor.com.
 2. Capable of withstanding positive and negative wind loads of 20 psf, without undue deflection or damage to components.
 3. Operation Cycles: Door components and operators capable of operating for not less than 20,000 cycles.
 - a. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
 4. Single thickness slats.
 5. Nominal Slat Size: 2-1/2 inches wide x required length.
 - a. Flat profile with fenestration.
 6. Finish: Primed.
 7. Finish: Manufacturer's standard powder coat finish; color to match Architect's sample.
 - a. Includes bottom bar and guides.
 8. Guides, Angles: Primed steel.

9. Bottom Bar or Angles: Primed steel.
 10. Hood Enclosure: Manufacturer's standard; stainless steel.
 11. Electric operation.
 12. Mounting: Surface mounted, unless otherwise indicated on Drawings.
- C. Coiling Counter Doors, Non-Fire-Rated: Stainless steel slat curtain.
1. Basis of Design Product: Overhead Door Corp.; Model 650: www.overheaddoor.com.
 2. Operation Cycles: Door components and operators capable of operating for not less than 20,000 cycles.
 - a. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
 3. Mounting: Interior face mounted, unless otherwise indicated on Drawings.
 4. Nominal Slat Size: 1-1/2 inches wide.
 5. Slat Profile: Flat.
 6. Finish, Stainless Steel: No. 4 - Brushed.
 - a. Includes slats, hood enclosure, bottom bar, and guides.
 7. Guides: Formed track; same material and finish unless otherwise indicated.
 8. Bottom Bar or Angles: same finish as slats unless otherwise indicated.
 9. Hood Enclosure: Manufacturer's standard; primed steel.
 10. Electric operation.

2.03 MATERIALS AND COMPONENTS

- A. Curtain Construction: Interlocking slats.
1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
 - a. Counter Doors: Optionally a tube may be used.
 3. Weatherstripping for Exterior Doors: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.
 4. Smoke Seals: Provide brush or gasket type weatherstripping seals to prevent passage of smoke and hot gases in compliance with UL 1784 testing requirements.
 5. Steel Slats: ASTM A653/A653M galvanized steel sheet.
 - a. Thickness: As recommended by overhead door manufacturer.
 - b. Galvanizing: Minimum G90 coating.
 6. Stainless Steel Slats: ASTM A666, Type 304, rollable temper.
 - a. Thickness: As recommended by overhead door manufacturer.
 7. Aluminum Slats: ASTM B221 (ASTM B221M), aluminum alloy Type 6063; [] inch minimum thickness.
- B. Guide Construction: Continuous, of profile to retain door in place, mounting brackets of same metal.
1. Guides:
 - a. Steel Shapes:
 - 1) Steel Angle: ASTM A36/A36M steel, size as recommended by overhead door manufacturer.
 - (a) Hot-dip galvanized in compliance with ASTM A123/A123M where indicated.
 - b. Sheet Metal:
 - 1) Formed Stainless Steel: ASTM A 666, Type 304, rollable temper.
 - (a) Thickness: As recommended by overhead door manufacturer.
- C. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
1. Formed Steel Sheet: ASTM A653/A653M galvanized steel sheet.
 - a. Thickness: As recommended by overhead door manufacturer.
 - b. Galvanizing: Minimum G90 coating.
 2. Formed Stainless Steel: ASTM A 666, Type 304, rollable temper.
 - a. Thickness: As recommended by overhead door manufacturer.

- D. Lock Hardware:
 - 1. For motor operated units, additional lock or latching mechanisms are not required.
- E. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

2.04 ELECTRIC OPERATION

- A. 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.
- B. Electric Operators:
 - 1. Mounting: Side mounted.
 - 2. Motor Enclosure:
 - a. Exterior Coiling Doors: NEMA MG 1, Type 4; open drip proof.
 - b. Interior Coiling Doors: NEMA MG 1, Type 1; open drip proof.
 - 3. Motor Rating: 1/2 hp; continuous duty, unless otherwise recommended by overhead door manufacturer.
 - 4. Motor Voltage: 120 volts, single phase, 60 Hz.
 - 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 - 6. Controller Enclosure: NEMA 250, Type 1.
 - 7. Opening Speed: 12 inches per second.
 - 8. Brake: Adjustable friction clutch type, activated by motor controller.
 - 9. Manual override in case of power failure.
 - 10. Refer to Division 26 for electrical connections.
- C. Automatic-Closing Device:
 - 1. Equip each fire-rated door with an automatic-closing device and governor unit complying with NFPA 80, and an easily tested and reset release mechanism.
 - 2. Release mechanism for motor-operated doors shall allow testing without mechanical release of the door.
 - 3. Automatic-closing device shall be designed for activation by the following:
 - a. Building fire-detection, smoke-detection, and alarm systems.
- D. 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.
- E. Control Station: Provide standard key-operated (Open-Close-Stop) momentary-contact control device for each operator conforming to UL 325.
 - 1. 24 volt circuit.
 - 2. Recess mounted, at location indicated on Drawings.
 - 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide electric sensing edge as required with momentary-contact control device.
- F. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install smoke door assemblies in accordance with NFPA 105.
- C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

- D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- F. Coordinate installation of electrical service with Division 26.
- G. Complete wiring from disconnect to unit components.
- H. Install enclosure and perimeter trim.
- I. Test and adjust controls and safety devices.

3.03 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.
- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field quality control and inspection.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Operate doors to confirm proper operation and door performance.
 - 2. Test controls and safety devices.
 - 3. Test door release, closing, and alarm operations when activated by smoke detector or building's fire-alarm system. Test manual operation of closed door. Reset door-closing mechanism after successful test.
 - 4. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80.
 - 5. Prepare field inspection reports.
- C. Repair or replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.05 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.

3.06 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

3.07 DEMONSTRATION AND TRAINING

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION

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SECTION 08 4229 - AUTOMATIC ENTRANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Packaged power-operated door assemblies of following types:
 - 1. Sliding type.
- B. Controllers, actuators and safety devices.
- C. Maintenance.

1.02 DEFINITIONS

- A. AAADM: American Association of Automatic Door Manufacturers.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. 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).
- C. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2017.
- D. BHMA A156.10 - American National Standard for Power Operated Pedestrian Doors 2017.
- E. ITS (DIR) - Directory of Listed Products current edition.
- F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL (DIR) - Online Certifications Directory Current Edition.
- I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
 - 2. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.
- C. Product Data: Provide data on system components, sizes, features, and finishes.
- D. Samples: Submit two samples of exposed to view hardware, carpet with frame, and attachment hardware.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- H. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.
- I. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Wrenches and other tools required for maintenance of equipment.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years of documented experience, and a member of AAADM.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years documented experience and approved by manufacturer.
 - 1. Certified by AAADM.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide two year manufacturer warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sliding Automatic Entrance Door Assemblies:
 - 1. ASSA ABLOY Entrance Solutions; Besam SL500: www.besam-usa.com
 - 2. DORMA USA, Inc: www.dorma.com
 - 3. Stanley Access Technologies; Dura-Glide 2000 Sliding: www.stanleyaccess.com

2.02 POWER OPERATED DOORS

- 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.
 - 1. Sliding and Folding Door Operators: In the event of power failure, provide for manual open, close, and break-away operation of door leaves.
 - 2. Packaged Door Assemblies: Provide components by single manufacturer, factory-assembled, including doors, frames, operators, actuators, and safeties.
 - a. Finish exposed equipment components to match door and frame finish.
 - 3. Air Leakage: Maximum of 1.0 cu ft/min/sq ft of wall area, when tested in accordance with ASTM E283 at 1.57 lbs/sq ft pressure differential across assembly.
 - 4. 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.
 - 5. Exterior and Vestibule Doors: Provide equipment suitable for operating temperature range of minus 20 to plus 140 degrees F ambient.
- B. Sliding and Folding 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, maximum, measured at 1 inch from the latch edge of the door at any point in the closing cycle.

2.03 AUTOMATIC ENTRANCE DOOR ASSEMBLIES

- A. Comply with ADA Standards for egress requirements.
- B. Framing and Transom Members: Provide manufacturer's standard extruded aluminum framing, reinforced as required to support imposed loads.
 - 1. Nominal Sizes:
 - a. Single Slide: 1-3/4 inch wide by 4-1/2 inch deep.
 - 2. Transoms: Provide flush glazed transom with framing that is integral with automatic entrance framing system.

- C. 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.
 - 1. Door Thickness: 1-3/4 inch, nominal.
 - 2. Stile Design:
 - a. Wide stile, 4 inch, nominal width.
 - 3. Top Rail Height: 4 inch, nominal.
 - 4. Center Rail (Muntin Bar) Height: 6 inch, nominal.
 - 5. Bottom Rail Height: 4 inch, nominal.
 - 6. Glazing Stops: Manufacturer's standard snap-on extruded aluminum square stops with preformed resilient glazing gaskets.
 - 7. Glazing Stop Width: Manufacturers standard.
 - 8. Glazing Thickness: 1/4 inch laminated.
- D. Sliding Automatic Door: Single leaf track-mounted, electric operation, extruded aluminum glazed door, with frame, and operator concealed overhead.
 - 1. Operation: Power open, power boost operation.
 - 2. Exterior-Side Actuator/Safety: Motion sensor.
 - 3. Interior-Side Actuator/Safety: Motion sensor.
 - 4. Hold Open: Toggle switch at inside head of doors; this is not a fire-rated door.
 - 5. Door and Frame Finish: Painted to match adjacent framing system.

2.04 CONTROLLERS, ACTUATORS, AND SAFETIES

- A. Controller: Provide microprocessor operated controller for each door.
- B. Comply with BHMA A156.10 for actuator and safety types and zones.

2.05 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics:
 - 1. 120 volts, single phase, 60 Hz.
- B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
- C. Disconnect Switch: Factory mount disconnect switch in control panel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available and is of the correct characteristics.

3.02 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Provide for thermal expansion and contraction of door and frame units and live and dead loads that may be transmitted to operating equipment.
- C. Provide for dimensional distortion of components during operation.
- D. Coordinate installation of components with related and adjacent work; level and plumb.

3.03 ADJUSTING

- A. Adjust door equipment for correct function and smooth operation.

3.04 CLEANING

- A. Remove temporary protection, clean exposed surfaces.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.06 MAINTENANCE

- A. See Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- B. Provide service and maintenance of operating equipment for one year from Date of Substantial Completion, at no extra charge to Owner.

END OF SECTION

SECTION 08 4313 - ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront (Front-Set Style, Structural Sealant Glazed Verticals, Thermally-Broken).
- B. Insulated infill panels.
- C. Aluminum doors and frames.

1.02 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Steel attachment members.
- B. Section 05 5000 - Metal Fabrications: Steel attachment devices.
- C. Section 07 8400 - Firestopping: Firestop at system junction with structure.
- D. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- E. Section 08 1612 - FRP-Faced Aluminum Doors and Frames: FRP-faced doors installed in aluminum-framed storefront systems.
- F. Section 08 4229 - Automatic Entrances.
- G. Section 08 4413 - Glazed Aluminum Curtain Walls.
- H. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.
- I. Section 08 8000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- C. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems 2014.
- D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- E. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- F. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- H. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- J. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- K. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- M. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- N. 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).

- O. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.
- P. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- Q. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors 2002 (Reapproved 2018).
- R. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
 - 1. Include details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
- D. Samples:
 - 1. Submit three samples for each finish specified, not less than 6 inches square or 6 inches long for linear components.
 - 2. Submit three samples of infill panels for each color and finish, not less than 6 inches square.
- E. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
 - 1. Include storefront manufacturer's field representative's field observation reports.
- G. Designer's Qualification Statement.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least 5 years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least 5 years of documented experience and approved by manufacturer.

1.07 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-ups.

- B. Provide minimum 4 by 8 feet mock-up including each component being used on the project. Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, and perimeter sealant.
- C. Locate on-site where directed by Architect; mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer's warranty for defects in workmanship and materials.
- C. Provide 20 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

- A. Front-Set Style, Structural Sealant Glazed Verticals, Thermally-Broken:

2.02 MANUFACTURERS

- A. Thermally Broken Storefront Products - High Performance:
 - 1. Basis of Design: Kawneer North American, an Arconic company; Trifab 451T Framing System with SSG: www.kawneer.com.
 - 2. Other Manufacturers: Provide either the product identified as "Basis of Design" equivalent products as manufactured by one of the following:
 - a. EFCO Corporation, an Apogee Enterprises, Inc. company
 - b. Oldcastle BuildingEnvelope
 - c. Tubelite Inc, an Apogee Enterprises, Inc. compan
 - d. U. S. Aluminum, part of the C. R. Laurence Family of Companie
 - e. YKK AP America, Inc
 - f. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Swing Door Manufacturers:
 - 1. Any of the manufacturers specified for storefront products.
- C. Source Limitations: Obtain storefront systems, including swing doors, from one manufacturer.
 - 1. Storefront systems shall be same manufacturer as that of curtain wall specified in Section 08 4413 - Glazed Aluminum Curtain Walls.

2.03 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Thermal Breaks: Manufacturer's standard high performance dual pour and debridge system.
 - 2. Glazing Rabbet: For 1 inch insulating glazing, unless otherwise indicated.
 - 3. Framing Face Width: 2 inches.
 - 4. Framing Depth: 4-1/2 inches.
 - 5. Finish: Superior performing organic coatings.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - 6. Finish Color: As selected by Architect from manufacturer's standard line.

7. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 8. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 9. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 10. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 11. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 12. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Performance Requirements:
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of ASCE 7 and as indicated on Drawings; not less than 25 lbf/ sq ft.
 - b. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.
 2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
 3. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.
 4. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.
 5. Overall U-value Including Glazing: 0.38 Btu/(hr sq ft deg F), maximum.

2.04 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
 3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
 - a. Provide as required to comply with performance requirements.
- B. Glazing: As specified in Section 08 8000.
- C. Infill Panels: Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
1. Overall Thickness: 1 inch.
 2. Face Sheet: 0.32 inch thick smooth aluminum on 3 mm thick corrugated polypropylene substrate.
 3. Core: Rigid polystyrene (EPS) insulation core with R-value of 4.
 4. Back Sheet: 0.32 inch thick smooth aluminum on 3 mm thick corrugated polypropylene substrate.
 5. Finish: Same as storefront.
 6. Products:
 - a. Citadel Architectural Products; GlazeGuard 1000 WR+; www.citadelap.com.
 - b. Laminators, Inc.; Thermolite; www.laminatorsinc.com.
 - c. Mapes Panels LLC; Corelite; www.mapespanels.com.

- d. Substitutions: Refer to Section 01 6000 - Product Requirements.
- D. Swing Doors: Glazed aluminum.
 - 1. Style: Wide style.
 - 2. Thickness: 1-3/4 inches.
 - 3. Top Rail: 5 inches wide.
 - 4. Vertical Stiles: 5 inches wide.
 - 5. Bottom Rail: 12 inches wide.
 - 6. Glazing Stops: Square.
 - 7. Finish: Same as storefront.

2.05 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Fasteners: Stainless steel.
- E. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.
- F. Concealed Flashings: Stainless steel, 26 gage, 0.0187 inch minimum thickness.
- G. Glass and Glazing Accessories: As specified in Section 08 8000.

2.06 FINISHES

- A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.
 - 1. Color and Gloss: Two or three-coat custom color to match Architect's sample.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.07 HARDWARE

- A. For each door, include weatherstripping and sill sweep strip.
- B. Other Door Hardware: As specified in Section 08 7100.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Sill Sweep Strips: Resilient seal type, of neoprene; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install glass and infill panels in accordance with Section 08 8000 - Glazing.
- J. Install door hardware as specified in Section 08 7100 - Door Hardware.
- K. Coordinate installation of electrical connections to electrical hardware items.
- L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
- B. See Section 01 4000 - Quality Requirements, for general testing and inspection requirements.
- C. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of three tests in each designated area as directed by Architect.
 - 2. Conduct tests in each area prior to 10 percent, 50 percent, and 90 percent completion of this work.
- D. Owner may engage an independent inspection agency to perform additional tests and inspections as follows:
 - 1. Provide field testing of installed storefront system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
 - a. Perform a minimum of three tests in each designated area as indicated on drawings.
 - b. Conduct tests in each area prior to 10 percent, 50 percent, and 90 percent completion of this work.
 - c. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 8 psf.
 - 1) Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
 - d. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 6.20 psf.
 - 1) Maximum allowable rate of air leakage is 0.09 cfm/sq ft.
- E. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

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3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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SECTION 08 4413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed curtain wall.
- B. Aluminum doors and frames.

1.02 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Steel attachment members.
- B. Section 05 5000 - Metal Fabrications: Steel attachment devices.
- C. Section 07 8400 - Firestopping: Firestop at system junction with structure.
- D. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- E. Section 081612 - FRP-Faced Aluminum Doors and Frames: FRP-faced door installed in glazed aluminum curtain wall systems.
- F. Section 08 4229 - Automatic Entrances.
- G. Section 08 4313 - Aluminum-Framed Storefronts: Entrance framing and doors.
- H. Section 08 7100 - Door Hardware
- I. Section 08 8000 - Glazing.
- J. Section 09 2116 - Gypsum Board Assemblies: Metal stud and gypsum board wall at interior of curtain wall.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- C. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems 2014.
- D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- E. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- F. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- H. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- J. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- K. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- M. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- N. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants 2018.
- O. 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).

- P. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- Q. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors 2002 (Reapproved 2018).
- R. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
 - 1. Include details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
- D. Samples:
 - 1. Submit three samples for each finish specified, not less than 6 inches square or 6 inches long for linear components.
- E. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- F. Structural Sealant Glazing (SSG): Submit product data and calculations showing compliance with performance requirements.
- G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
 - 1. Include curtain wall manufacturer's field representative's observation reports.
- H. Designer's Qualification Statement.
- I. Manufacturer's Qualification Statement.
- J. Installer's Qualification Statement.
- K. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Verify that each component is appropriate for use in structural sealant glazing (SSG) application in regards to at least the following properties; size, shape, dimensions, material, self-life, storage conditions, and color.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than 5 years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of type specified and with at least 5 years of documented experience and approved by manufacturer.

1.07 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-ups.

- B. Provide minimum 4 by 16 feet mock-up including each component being used on the project. Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, and perimeter sealant.
- C. Locate on-site where directed by Architect; mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer's warranty for defects in workmanship and materials.
- C. Provide 20 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Glazed Aluminum Curtain Walls - Structural Sealant Glazing (SSG):
 - 1. Basis of Design: Kawneer North American, an Arconic company; 1620 Wall SSG Curtain Wall: www.kawneer.com.
 - 2. Other Manufacturers: Provide either the product identified as "Basis of Design" equivalent products as manufactured by one of the following:
 - a. CMI Architectural; 6600 Wall: www.cmiarch.com.
 - b. EFCO Corporation, an Apogee Enterprises, Inc. company
 - c. Oldcastle BuildingEnvelope.
 - d. Tubelite Inc, an Apogee Enterprises, Inc. company
 - e. U. S. Aluminum, part of the C. R. Laurence Family of Companies
 - f. YKK AP America, Inc.
 - g. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Swing Door Manufacturers:
 - 1. Any of the manufacturers specified for curtain wall products.
- C. Source Limitations: Obtain curtain wall systems, including swing doors, from one manufacturer.
 - 1. Curtain wall systems shall be same manufacturer as that of storefront systems specified in Section 08 4313 - Aluminum-Framed Storefronts.

2.02 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Thermal Breaks: Manufacturer's standard pour and debridge system.
 - 2. Outside glazed, with pressure plate and mullion cover.
 - a. Pressure Plate: Metal plate.
 - b. Mullion Cover: Manufacturer's standard.
 - 3. Structural sealant glazing (SSG) adhesive on vertical sides and pressure plate and mullion cover on horizontal sides.
 - 4. Fabrication Method: Either shop/factory or field fabricated system.
 - 5. Glazing Method: Field glazed system.
 - 6. Vertical Mullion Face Width: 2 inches.
 - 7. Vertical Mullion Depth From Face of Glazing or Standard Mullion Cover to Back of Frame: 6 to 7-1/2 inches, unless otherwise indicated.
 - 8. Finish: Superior performing organic coatings.

- a. Factory finish surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
9. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 10. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 11. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 12. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

2.03 PERFORMANCE REQUIREMENTS

- A. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
 1. Design Wind Loads: Comply with the requirements of ASCE 7 and as indicated on Drawings; but not less than 25 lbf/ sq ft.
 - a. Member Deflection: For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch, whichever is less and with full recovery of glazing materials.
 - b. Member Deflection: For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch, with full recovery of glazing materials.
 2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
 3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F surface temperature.
 - b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
 4. Structural Sealant Glazing (SSG) System: For individual glass lites, design framing members to not exceed a deflection normal to the wall of L/175 between supports with 3/4 inch maximum, and a deflection parallel to the wall of L/360 with 1/8 inch maximum, whichever is less.
- B. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
 1. Test Pressure Differential: 12 psf.
 2. Test Method: ASTM E331.
- C. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.
- D. Thermal Performance Requirements:
 1. Condensation Resistance Factor of Framing: 65, minimum, measured in accordance with AAMA 1503.
 2. Overall U-value Including Glazing: 0.42 Btu/(hr sq ft deg F), maximum.

2.04 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

1. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: As specified in Section 08 8000.
- C. Swing Doors: Glazed aluminum.
 1. Style: Wide style.
 2. Thickness: 1-3/4 inches.
 3. Top Rail: 5 inches wide.
 4. Vertical Stiles: 5 inches wide.
 5. Bottom Rail: 12 inches wide.
 6. Glazing Stops: Square.
 7. Finish: Same as storefront system.

2.05 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- E. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.
- F. Concealed Flashings: Stainless steel, 26 gage, 0.0187 inch minimum thickness.
- G. Firestopping: As specified in Section 07 8400.
- H. Structural Sealant Glazing (SSG) Adhesive: As specified in Section 08 8000 - Glazing, subject to approval of curtainwall manufacturer.
- I. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; type recommended by structural sealant glazing (SSG) adhesive manufacturer.
- J. Glass and Glazing Accessories: As specified in Section 08 8000.

2.06 FINISHES

- A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.
 1. Color and Gloss: Two or three-coat custom color to match Architect's sample.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.07 HARDWARE

- A. For each door, include weatherstripping and sill sweep strip.
- B. Other Door Hardware: As specified in Section 08 7100.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Sill Sweep Strips: Resilient seal type, of neoprene; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install curtain wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Refer to Section 07 8400 - Firestopping for installation of firestopping at each floor slab edge.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install operating sash.
- J. Pressure Plate Framing: Install glazing and infill panels in accordance with Section 08 8000.
- K. Structural Sealant Glazing (SSG) Adhesive: Install structural sealant glazing adhesive and weatherseal sealant in accordance with manufacturer's instructions and Section 08 8000 - Glazing.
- L. Install door hardware as specified in Section 08 7100 - Door Hardware.
- M. Coordinate installation of electrical connections to electrical hardware items.
- N. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.
- B. See Section 01 4000 - Quality Requirements, for general testing and inspection requirements.
- C. Water-Spray Test: Provide water spray quality test of installed curtain wall components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of three tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent, 50 percent, and 90 percent completion of this work.
- D. Owner may engage an independent inspection agency to perform additional tests and inspections as follows:
 - 1. Provide field testing of installed curtain wall system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
 - a. Perform a minimum of three tests in each designated area as indicated on drawings.
 - b. Conduct tests in each area prior to 10 percent, 50 percent, and 90 percent completion of this work.
 - c. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 12 psf.
 - 1) Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
 - d. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 6.20 psf.
 - 1) Maximum allowable rate of air leakage is 0.09 cfm/sq ft.

- E. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 **ADJUSTING**

- A. Adjust operating sash for smooth operation.

3.06 **CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 **PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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SECTION 08 6200 - UNIT SKYLIGHTS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Miscellaneous steel framing for rough opening.
- B. Section 06 1000 - Rough Carpentry: Wood framing for rough opening.
- C. Section 07 5323 - EPDM Membrane Roofing: Roofing system and base flashing at skylight curb.
- D. Section 07 6200 - Sheet Metal Flashing and Trim: Skylight counterflashing.
- E. Section 07 7200 - Roof Accessories: Manufactured curbs for installation of unit skylights.

1.02 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights 2017.
- B. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- E. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.
- F. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide structural, thermal, and daylighting performance values.
- C. Shop Drawings: Indicate configurations, dimensions, locations, fastening methods, and installation details.
- D. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
 - 1. Evidence of AAMA Certification.
 - 2. Evidence of WDMA Certification.
 - 3. Evidence of CSA Certification.
 - 4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty, including coverage for leakage due to defective skylight materials or construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Unit Skylights:
 - 1. Kingspan Light + Air, LLC; formerly Bristolite Daylighting Systems, Inc; Bristol : www.bristolite.com
 - 2. Velux America, Inc; VELUX Dynamic Dome: www.veluxusa.com

3. Wasco Skylights - Part of the VELUX Group; Ecosky model CEC2
: www.wascoskylights.com

4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SKYLIGHTS

- A. Skylights: Factory-assembled glazing in aluminum frame, free of visual distortion, and weathertight.
 1. Shape: Square dome.
 2. Glazing: Double.
 3. Operation: None; fixed.
 4. Nominal Size: As indicated on drawings.

2.03 PERFORMANCE REQUIREMENTS

- A. Provide unit skylights that comply with the following:
 1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific skylight type:
 2. Design Pressure (DP): In accordance with applicable codes.
 3. Allow for expansion and contraction within system components caused by a cycling surface temperature range of 170 degrees F without causing detrimental effects to system or components.
 4. Energy Code Compliance: Comply with ICC (IBC), ASHRAE Std 90.1 I-P, or the authorities having jurisdiction as required for unit skylights.

2.04 COMPONENTS

- A. Double Glazing: Acrylic plastic; factory sealed.
 1. Outer Glazing: Clear transparent.
 2. Inner Glazing: Clear transparent.
- B. Frames: ASTM B221 ASTM B221M Extruded aluminum thermally broken, reinforced and welded corner joints, integral curb frame mounting flange and counterflashing to receive roofing flashing system, with integral condensation collection gutter, glazing retainer; Kynar Fluoropolymer Two-Coat System finish.
 1. Color: White

2.05 ACCESSORIES

- A. Anchorage Devices: Type recommended by manufacturer, exposed to view.
- B. Counterflashings: Same metal type and finish as skylight frame.
- C. Protective Back Coating: Zinc molybdate alkyd.
- D. Sealant: Elastomeric, silicone or polyurethane, compatible with material being sealed .

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that openings and substrate conditions are ready to receive work of this section.
- C. Verify that curbs installed under other sections are complete.

3.02 PREPARATION

- A. Apply protective back coating on aluminum surfaces of skylight units that will be in contact with cementitious materials or dissimilar metals.

3.03 INSTALLATION

- A. Install unit skylights in accordance with manufacturer's instructions and ASTM E2112.
- B. Install skylight units and mount securely to curb assembly; install counterflashing as required.
- C. Apply sealant to achieve watertight assembly.

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3.04 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces; wipe surfaces clean.
- C. Remove excess sealant.

END OF SECTION

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SECTION 08 7100 - DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for hollow metal, wood, aluminum and FRP-faced aluminum doors.
- B. Electrically operated and controlled hardware.
- C. Cylinders for doors or locks specified in other Sections.

1.02 RELATED REQUIREMENTS

- A. Section 08 7100.01 - Door Hardware Sets: Door hardware schedules.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; attendance is required by affected installers and the following:
 - 1. Architect.
 - 2. Hardware Installer.
 - 3. Owner's Security Consultant.
- D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- E. Keying Requirements Meeting:
 - 1. Schedule meeting at project site prior to Contractor occupancy.
 - 2. Attendance Required:
 - a. Owner.
 - b. Architect.
 - c. Hardware Installer.
 - d. Owner's Security Consultant.
 - 3. Agenda:
 - a. Establish keying requirements.
 - b. Establish keying submittal schedule and update requirements.
 - 4. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
 - a. Access control requirements.
 - b. Key control system requirements.
 - 5. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
 - 6. Deliver established keying requirements to manufacturers.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
 - 1. List and describe each opening separately; include doors with identical hardware, except hand, in single heading. Include door number, room designations, degree of swing, and hand.

2. List hardware items; include manufacturer's name, quantity, product name, catalog number, size, base metal, finish, fasteners and related details where applicable.
3. List related details; include dimensions, door and frame material and other conditions affecting hardware.
4. Electrified Door Hardware:
 - a. Submit diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
 - 1) Submit front and back elevations of each door opening showing electrified devices with connections installed.
 - 2) Submit operations narrative describing how opening operates from either side at any given time.
 - 3) Submit point-to-point wiring diagram that shows each device in door opening system with related colored wire connections to each device.
- D. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- E. Keying Schedule:
 1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Architectural Hardware Consultant (AHC) inspection reports.
- I. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- J. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- K. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 1. See Section 01 6000 - Product Requirements, for additional provisions.
 2. Lock Cylinders: Ten for each master keyed group.
 3. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

1.05 **QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least five years of documented experience and approved by manufacturer.

1.06 **DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.07 **WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
 1. Butt Hinges: One year, minimum.
 2. Continuous Hinges: Lifetime, minimum.

3. Flush Bolts: One year, minimum.
4. Exit Devices and Trim: Three years, minimum.
 - a. Electrified Exit Device Components: One year, minimum.
5. Locksets and Cylinders: Three years, minimum.
 - a. Electrified Lockset Components: One year, minimum.
6. Closers: Thirty years, minimum.
7. Overhead stops and holders: One year, minimum.
8. Automatic Operators: Two years, minimum.
9. Other Hardware: One year, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
 1. Applicable provisions of federal, state and local codes.
 2. Accessibility: ADA Standards and ICC A117.1.
 3. Applicable provisions of NFPA 101.
 4. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 5. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR) or ITS (DIR) as suitable for application indicated.
 6. Hardware for Smoke and Draft Control Doors: Provide door hardware that complies with local codes, and requirements of assemblies tested in accordance with UL 1784.
 - a. Air Leakage Rate: Tested in accordance with UL 1784, with air leakage rate not to exceed 3.0 cfm/sf of door opening at 0.10 inch of water for both ambient and elevated temperature tests.
 7. Listed and certified compliant with specified standards by BHMA (CPD).
 8. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
 9. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
 10. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.
- D. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.
- E. Fasteners:
 1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
 2. Fire-Rated Applications: Comply with NFPA 80.

2.02 BUTT HINGES

- A. Manufacturers:
 1. Basis-of-Design: 5BB1HW and 5BB1; Ives; an Allegion company: www.us.allegion.com.

2. Other acceptable manufacturers:
 - a. Bommer Industries, Inc: www.bommer.com.
 - b. McKinney; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.
 - d. Stanley Security Solutions; a Dormakaba Group company:
www.stanleysecuritysolutions.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- B. Butt Hinges: Comply with BHMA A156.1, Grade 1.
 1. Templated Hinges: Comply with BHMA A156.7.
 2. Provide hinge width as required to clear surrounding trim.
 3. Provide butt hinges on every swinging door unless otherwise indicated.
 - a. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 - 1) Provide ball-bearing hinges at each door.
 - b. Provide stainless steel hinges at exterior doors.
 - 1) Provide non-removable pins at outswinging exterior doors.
 - c. Provide heavy weight hinges at fire rated doors.
 4. Provide following quantity of butt hinges for each door:
 - a. Door Height - Up to 60 inches: Two hinges.
 - b. Door Height - 60 to 90 inches: Three hinges.
 - c. Door Height - 90 to 120 inches: Four hinges.
 - d. Door Height - Over 120 inches: One additional hinge per each additional 30 inches in height.
 - e. Dutch Doors: Two hinges each leaf.
 5. For 1-3/4 inch thick doors, provide following butt hinge sizes:
 - a. Doors up to 36 inches wide: 4-1/2 high x 4-1/2 wide.
 - b. Doors 36 to 48 inches wide: 5 high x 4-1/2 wide.
 - c. Doors over 48 inches wide: 6 high x 5 wide.

2.03 CONTINUOUS HINGES

- A. Manufacturers:
 1. Basis-of-Design: 112HD; Ives Hardware; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Architectural Builder's Hardware Mfg. Inc.: www.abhmfg.com.
 - b. Bommer Industries, Inc: www.bommer.com.
 - c. McKinney; an Assa Abloy Group company: www.assaabloydss.com.
 - d. Hager Companies: www.hagerco.com.
 - e. SELECT Products Limited: www.select-hinges.com.
 - f. Stanley Security Solutions; a Dormakaba Group company:
www.stanleysecuritysolutions.com.
 - g. Substitutions: See Section 01 6000 - Product Requirements.
- B. Continuous Hinges: Complying with BHMA A156.26, Grade 1.
 1. Provide continuous hinges on every aluminum swinging door and frame unless otherwise indicated.
 - a. Provide aluminum geared hinges.
 - 1) Flush Mounted.
 - 2) Heavy duty.
 - b. Cap Finish: Color and finish to match door and frame, unless otherwise indicated.

2.04 FLUSHBOLTS

- A. Manufacturers:
 - 1. Basis-of-Design: Ives Hardware; an Allegion company: www.us.allegion.com.
 - 2. Other acceptable manufacturers:
 - a. Architectural Builder's Hardware Mfg. Inc.: www.abhmfg.com.
 - b. Hager Companies: www.hagerco.com.
 - c. Rockwood Manufacturing Company, an Assa Abloy Group company: www.assaabloydss.com.
 - d. Trimco: www.trimcohardware.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- B. Flush Bolts: Complying with BHMA A156.16, Grade 1.
 - 1. Provide the following:
 - a. Automatic flush bolts; meets BHMA A156.3.
 - b. Constant latching flush bolts; meets BHMA A156.3.
 - c. Manual flush bolts.
 - 2. Flush bolt Throw: 3/4 inch, minimum.
 - 3. Provide flush bolts in leading edge of inactive door leaves.
 - a. One top bolt into top of frame and, where indicated, one bottom bolt into floor or threshold.
 - b. Standard rod length shall be 12 inches. At oversized doors, provide extended rod lengths as required to accommodate actual door heights.
 - 4. Provide dustproof floor strike for bolt into floor, except at metal thresholds.
 - a. Basis-of-Design: Ives Hardware; an Allegion company; DP2: www.us.allegion.com or a comparable product from other specified flush bolt manufacturer.
 - 5. Constant Latching Flush Bolts: Automatically latch upon closing of door; manually retracted top bolt, automatically retracted bottom bolt; located on inactive leaf of pair of doors.
 - 6. Automatic Flush Bolts: Automatically latch upon closing of door; automatic retraction of bolts when active leaf is opened; located on inactive leaf of pair of doors.

2.05 EXIT DEVICES

- A. Manufacturers:
 - 1. Basis-of-Design: 98 Series; Von Duprin; an Allegion company: www.us.allegion.com.
 - 2. Other acceptable manufacturers:
 - a. Precision (phi); a Dormakaba Holding Inc. company: www.precisionhardware.com.
 - b. Sargent; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Exit Devices: Complying with BHMA A156.3, Grade 1.
 - 1. Provide exit devices in functions as specified in hardware sets.
 - 2. Lever design to match Von Duprin Style 07.
 - a. Provide vandal resistant outside trim.
 - 3. Provide dogging on non-rated devices.
 - a. Hex key dogging.
 - b. Where indicated, provide cylinder dogging instead of hex key dogging.
 - 4. Provide exit devices properly sized for door width and height.
 - 5. Provide strike as recommended by manufacturer for application indicated.

6. Provide less bottom rod (LBR) at scheduled locations to eliminate use of floor mounted strikes.
7. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.
8. Where indicated, provide electrified exit devices that comply with above requirements and as follows:
 - a. Voltage: 24 VDC.
 - 1) Provide power supplies by same manufacturer as exit devices.
 - b. Provide fail-secure exit devices unless otherwise indicated.
 - c. Provide electrified exit devices from same manufacturer as mechanical exit devices.
 - d. For electrical options, provide quick connect plug-in pre-wired connectors.

2.06 ELECTRIC STRIKES

- A. Manufacturers:
 1. Basis-of-Design: Von Duprin; an Allegion company: www.us.allegion.com. Products as follows:
 - a. Rim Devices: 6100 Series.
 - b. Mortise and Cylindrical Devices: 6200 Series.
 2. Other acceptable manufacturers:
 - a. Best Access Systems; a Dormakaba Holding Inc. company; www.bestaccess.com.
 - b. Hager Companies: www.hagerco.com.
 - c. HES; an Assa Abloy Group company: www.assaabloydss.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Electric Strikes: Complying with BHMA A156.31, Grade 1.
 1. Provide UL (DIR) listed burglary-resistant electric strike; style to suit locks.
 - a. Comply with UL 1034.
 2. Provide UL (DIR) listed electric strikes for fire rated doors and frames.
 3. Provide non-handed 24 VDC electric strike suitable for door frame material and scheduled lock configuration.
 - a. Provide power supplies by same manufacturer as electric strike.
 4. Provide fail-secure strikes unless otherwise indicated.
 5. Provide corrosion-resistant materials and construction.
 6. For electrical options, provide quick connect plug-in pre-wired connectors.

2.07 ELECTROMAGNETIC LOCKS

- A. Manufacturers:
 1. Basis-of-Design: M400 Series; Schlage; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Hager Companies: www.hagerco.com.
 - b. Securitron; an Assa Abloy Group company: www.assaabloydss.com.
 - c. DORMA USA, Inc.; a Dormakaba Holding Inc. company; www.dorma.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Electromagnetic Locks: Complying with BHMA A156.23, Grade 1.
 1. Holding Force: 1200 lbs, minimum.
 2. Voltage: 24 VDC.
 - a. Provide power supplies by same manufacturer as electromagnetic locks.
 3. Provide electromagnetic locks for fire-rated doors in compliance with UL 10C.
 4. Provide burglary-resistant electromagnetic locks complying with UL 1034.

5. Mounting: Surface mounted to door and frame on secure side, with fasteners, brackets, and spacer bars as required for application.

2.08 CYLINDERS AND CORES

- A. Manufacturers - Cores:
 1. Key to existing keying system.
 - a. Core manufacturer, brand, and model shall match Owner's existing products.
- B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
 1. Provide small format interchangeable core (SFIC) type cylinders, Grade 1, with seven-pin core in compliance with BHMA A156.5.
 - a. Provide cylinders from same manufacturer as locking device.
 - b. Provide all cores for this project from one supplier regardless of door type, locking device, and location.
 - c. Provide cams and/or tailpieces as required for locking devices.
 2. Construction Cores:
 - a. Provide disposable or keyed construction cores for use during construction period.
 - 1) Prior to Owner occupancy and near the end of the construction period, replace construction cores with permanent cores.

2.09 CYLINDRICAL LOCKSETS

- A. Manufacturers:
 1. Basis-of-Design: ND Series; Schlage; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Best Access Systems, a Dormakaba Holding Inc. company: www.bestaccess.com.
 - b. Corbin Russwin; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Cylindrical Locksets (Bored): Complying with BHMA A156.2, Grade 1, 4000 Series.
 1. Provide locks and latch sets in functions as specified in hardware sets.
 2. Trim: Provide lever handle and rose, unless otherwise indicated.
 - a. Lever Style:
 - 1) To match Schlage Athens (ATH).
 3. Provide vandal resistant locks with freely rotating levers in all locking functions.
 4. Provide locks that comply with ICC A117.1 accessibility standards.
 5. Bored Hole: 2-1/8 inch diameter.
 6. Latchbolt Throw: 1/2 inch, minimum.
 7. Backset: 2-3/4 inch, unless otherwise indicated.
 8. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
 - a. Finish: To match lock or latch.
 9. Where indicated, provide occupancy indicators.
 10. Where indicated, provide electrified locksets that comply with above requirements.
 - a. Voltage: 24 VDC.
 - b. Provide fail-secure locksets unless otherwise indicated.
 - c. Provide electrified locksets from same manufacturer as mechanical locksets.

2.10 MORTISE LOCKSETS

- A. Manufacturers:
 1. Basis-of-Design: L Series; Schlage; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:

- a. Best Access Systems, a Dormakaba Holding Inc. company: www.bestaccess.com.
 - b. Corbin Russwin; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Mortise Locks: Complying with BHMA A156.13, Grade 1, Security, 1000 Series.
1. Provide locks and latch sets in functions as specified in hardware sets.
 2. Trim: Provide lever handle and rose, unless otherwise indicated.
 - a. Lever Style:
 - 1) To match Schlage Style 07.
 - b. Rose Style:
 - 1) To match Schlage Syle A.
 - c. Escutcheon Style:
 - 1) To match Schlage Style N.
 3. Provide vandal resistant locks with freely rotating levers in all locking functions.
 4. Provide locks that comply with ICC A117.1 accessibility standards.
 5. Provide locks with corrosion-resistant steel case and components.
 6. Latchbolt Throw: 3/4 inch, minimum.
 7. Deadbolt Throw: 1 inch, minimum.
 8. Backset: 2-3/4 inch unless otherwise indicated.
 9. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
 - a. Finish: To match lock or latch.
 10. Where indicated, provide occupancy indicators.
 11. Where indicated, provide electrified locksets that comply with above requirements.
 - a. Voltage: 24 VDC.
 - 1) Provide power supplies by same manufacturer as lockset.
 - b. Provide fail-secure locksets unless otherwise indicated.
 - c. Provide electrified locksets from same manufacturer as mechanical locksets.
 - d. For electrical options, provide quick connect plug-in pre-wired connectors.

2.11 TWO-POINT LOCKSETS

- A. Manufacturers:
1. Basis-of-Design: LM9200 Series; Schlage; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Sargent; an Assa Abloy Group company: www.assaabloydss.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Two-point Locksets:
1. Locksets shall have concealed vertical cables or rods controlling top and bottom latching.
 - a. Where indicated, delete the bottom latch.
 2. Provide locks and latch sets in functions as specified in hardware sets.
 3. Lever design to match other lockset trim.
 4. Provide locks that comply with ICC A117.1 accessibility standards.
 5. Provide strikes as recommended by manufacturer for application indicated.
 6. Where indicated, provide electrified locksets that comply with above requirements.
 - a. Voltage: 24 VDC.
 - b. Provide fail-secure locksets unless otherwise indicated.
 - c. Provide electrified locksets from same manufacturer as mechanical locksets.

2.12 AUXILIARY LOCKS (DEADBOLTS)

- A. Manufacturers:
 - 1. Basis-of-Design: B600 Series; Schlage; an Allegion company: www.us.allegion.com.
 - 2. Other acceptable manufacturers:
 - a. Best Access Systems, a Dormakaba Holding Inc. company: www.bestaccess.com.
 - b. Corbin Russwin; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Auxiliary Locks (Deadbolts): Complying with BHMA A156.5 and BHMA A156.36, Grade 1.
 - 1. Provide locks that comply with ICC A117.1 accessibility standards.
 - 2. Provide UL 10B listed locks for fire-rated doors.
 - 3. Type: Bored (cylindrical).
 - 4. Application: Bored.
 - 5. Backset: 2-3/4 inch, unless otherwise indicated.
 - 6. Bolt Throw: 1 inch, with latch made of hardened steel.

2.13 DOOR PULLS AND PUSH BARS

- A. Manufacturers:
 - 1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
 - 2. Hager Companies: www.hagerco.com.
 - 3. Ives, an Allegion company: www.allegion.com/us.
 - 4. Trimco: www.trimcohardware.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Door Pull and Push Bar Combination Set : Complying with BHMA A156.6.
 - 1. Basis-of-Design: 9190HD; Ives; an Allegion company: www.us.allegion.com.
 - a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 - 2. Bar Type: Push bar.
 - 3. Push Bar: Straight horizontal push bar.
 - a. Bar Width: 3 inches less than door width.
 - 4. Pull Type: Offset, bar type.
 - a. Center to Center Size: 10 inches.
 - 5. Bar Size: 1 inch round.
 - 6. Mounting: Provide back-to-back mounting with top of pull and latch side of push bar. Provide decorative thru-bolt at hinge stile and bottom of pull.
 - 7. Material: Stainless steel, unless otherwise indicated.
- C. Door Offset Pull: Complying with BHMA A156.6.
 - 1. Pull Type: Offset, 1 inch round pull bar.
 - 2. Center to Center Size: 10 inches.
 - 3. Mounting: Decorative blind thru-bolt (Ives Type O Mount).
 - 4. Material: Stainless steel, unless otherwise indicated.

2.14 COORDINATORS

- A. Manufacturers:
 - 1. Basis-of-Design: COR; Ives; an Allegion company: www.us.allegion.com.
 - 2. Other acceptable manufacturers:
 - a. Architectural Builder's Hardware Mfg. Inc.: www.abhmfg.com.
 - b. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.

- d. Trimco: www.trimcohardware.com.
- e. Substitutions: See Section 01 6000 - Product Requirements.

B. Coordinators:

1. Complying with BHMA A156.3.
2. Type: Bar, unless otherwise indicated.
 - a. Provide filler bar to cover remaining length of door stop.
 - b. Provide mounting brackets to accommodate other stop applied hardware.
3. Material: Aluminum, unless otherwise indicated.
4. Provide on door pairs having closers, overlapping astragal, self-latching or automatic flushbolts or other hardware requiring inactive door leaf to close before active door leaf.
5. Ensure that coordination of other door hardware affected by placement of coordinator is applied properly for proper door operation.

2.15 CLOSERS

A. Manufacturers:

1. Basis-of-Design: 4110/4010 Series; LCN; an Allegion company: www.us.allegion.com.
2. Other acceptable manufacturers:
 - a. Corbin Russwin; an Assa Abloy Group company: www.assaabloydss.com.
 - b. Hager Companies: www.hagerco.com.
 - c. Stanley Security Solutions; a Dormakaba Group company: www.stanleysecuritysolutions.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

B. Closers: Complying with BHMA A156.4, Grade 1.

1. Type: Surface mounted to door; heavy duty.
2. Provide closers for fire-rated doors in compliance with UL 10C.
3. Comply with ICC A117.1 accessibility standards.
4. Provide metal covers.
5. Provide closers with adjustable swing speed, latching speed, and backcheck features.
6. Provide mounting brackets, drop plates, and any other associated hardware or accessories required by door and frame conditions.
7. Provide rust inhibiting coating on closers at the following locations:
 - a. Exterior doors.
 - b. Other doors as indicated.
8. Provide door closers on the following doors:
 - a. Each exterior door.
 - b. Each fire-rated and smoke-rated door.
 - c. Other doors as indicated.
9. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.
10. Mounting locations: Mount closers as follows:
 - a. At corridor entry doors, mount closer on room side of door.
 - b. At exterior doors, mount closer on interior side of door.

2.16 LOW ENERGY AUTOMATIC DOOR OPERATORS

A. Manufacturers:

1. Basis-of-Design: 4600 Series; LCN; an Allegion company: www.us.allegion.com.
2. Other acceptable manufacturers:
 - a. Norton; an Assa Abloy Group company: www.assaabloydss.com.

- b. Stanley Access Technologies; a Dormakaba Group company:
www.stanleyaccess.com..
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Provide surface-applied electrohydraulic door operator; power opened and spring-action closed.
1. Complying with BHMA A156.19, Grade 1.
 2. Complying with ICC A117.1 accessibility standards.
 3. Complying with UL 10C at fire-rated doors.
 4. Provide operators with adjustable opening speed, opening force, and timing.
 5. Provide operators with easily accessible on-off switch and hold open function.
 6. Provide mounting brackets and any other associated hardware or accessories required by door and frame conditions.
 7. Electrical:
 - a. Input Power: 120 VAC at 1.5 amps.
 - b. Onboard Low-Voltage Supply: 24 VDC at 1 amp.
- C. Provide surface-applied electromechanical door operator; power opened and power closed.
1. Complying with BHMA A156.19, Grade 1.
 2. Complying with ICC A117.1 accessibility standards.
 3. Complying with UL 10C at fire-rated doors.
 4. Provide operators with programmable functions including, but not limited to, opening and closing speed, backcheck speed and position, and timing.
 5. Provide operators with auto reverse safety feature which will reverse the door's swing direction if it comes into contact with an object during opening or closing.
 6. Provide mounting brackets and any other associated hardware or accessories required by door and frame conditions.
 7. Electrical:
 - a. Input Power: 120 VAC.
 - b. Onboard Low-Voltage Supply: 24 VDC.
- D. Actuator Controls:
1. Manufacturers:
 - a. Actuator controls manufacturer shall be the same as the automatic door operator manufacturer.
 2. Wall Mounted Push Plate:
 - a. Type: Flush mounted; hard-wired, low voltage.
 - b. Size: 4-3/4 inches square, nominal.
 - c. Push Plate: Stainless steel with blue-filled handicap symbol and engraved "Push to Open" text.
 - d. Weather and vandal resistant.
 3. Jamb Mounted Push Plate:
 - a. Type: Flush mounted; hard-wired, low voltage.
 - b. Size: 1-1/2 inches wide by 4-3/4 inches high, nominal.
 - c. Push Plate: Stainless steel with blue-filled handicap symbol and engraved "Push to Open" text.
 - d. Weather and vandal resistant.
 4. Dual Wall Mounted Push Plates:
 - a. Type: Flush mounted; hard-wired, low voltage.
 - b. Size: 4-3/4 inches square, nominal.

- c. Duel Push Plates: Two stainless steel narrow vertical push plates each with blue-filled handicap symbol, engraved "Push to Open" text, and indicator arrow.
- d. Weather and vandal resistant.
5. Touchless Wall Mounted Push Plate:
 - a. Type: Flush mounted; hard-wired, low voltage.
 - b. Size: 4-3/4 inches square, nominal.
 - c. Push Plate: Plastic plate with "Wave to Open" text and touchless hand symbol.
6. Bollard Post:
 - a. Powder coated steel post with capped top.
 - b. Provide mounting bracket, expansion anchors, and all associated hardware for a complete installation.
 - c. Size: 42 inches high by 6 inches wide by 4 inches deep, nominal.
 - d. Designed to accept flush mounted 4-3/4 inch square actuator.

2.17 OVERHEAD STOPS AND HOLDERS

- A. Manufacturers:
 1. Basis-of-Design: 100 Series; Glynn-Johnson; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Architectural Builder's Hardware Mfg. Inc.: www.abhmfg.com.
 - b. Rixson; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Overhead Stops and Holders (Door Checks): Complying with BHMA A156.8, Grade 1.
 1. Provide overhead stop or holder at doors that are capable of swinging more than 110 degrees before striking wall or where door will strike fixed object such as sink, cabinet, and similar obstructions.
 2. Provide overhead stop or holder at all outswinging exterior doors.
 - a. Stops and holders at exterior doors shall be stainless steel.
 3. Stops and holders shall be heavy duty, concealed, overhead mounted stops and holders unless otherwise indicated.
 - a. Provide overhead holders only where indicated, otherwise provide an overhead stop.
 - b. Provide overhead stops at fire-rated doors; overhead holders are prohibited.
 4. Stops used in conjunction with automatic door operators shall not include a shock-absorbing mechanism.

2.18 PROTECTION PLATES

- A. Manufacturers:
 1. Basis-of-Design: 8400 Series; Ives; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Hager Companies: www.hagerco.com.
 - b. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Trimco: www.trimcohardware.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Protection Plates - General: Complying with BHMA A156.6.
 1. Includes the following:
 - a. Kick plates.
 - b. Mop plates.
 - c. Stretcher plates.
 - d. Armor plates.

2. Metal Properties: Stainless steel.
 - a. Metal, Standard Duty: Thickness 0.05 inch, minimum.
 - b. Metal, Heavy Duty: Thickness 0.062 inch, minimum.
3. Edges: Beveled, on four sides unless otherwise indicated.
4. Fasteners: Countersunk screw fasteners.
- C. Kick Plates:
 1. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
 - a. Size: 8 inch high by 2 inch less door width (LDW) on push side of door.
- D. Mop Plates:
 1. Mop Plates: Where indicated, provide along bottom edge of push side and pull side of doors to provide protection from cleaning liquids and equipment damage to door surface.
 - a. Size: 6 inch high by 1-1/2 inch less door width (LDW) on pull side and 2 inch LDW on push side of door.
- E. Stretcher Plates:
 1. Stretcher Plates: Where indicated, provide along middle of push side of doors to provide protection from stretcher hitting door and damaging door surface.
 - a. Size: 6 inch high by 2 inch less door width on push side of door.
- F. Armor Plates:
 1. Armor Plates: Where indicated, provide on bottom half of push side of doors that require protection from objects moving through openings that may damage door surface.
 - a. Size: 48 inch high by 2 inch less door width on push side of door.

2.19 RAIN DRIP GUARDS

- A. Manufacturers:
 1. Basis-of-Design: 17A; National Guard Products, Inc.: www.ngpinc.com.
 2. Other acceptable manufacturers:
 - a. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
 - b. Hager Companies: www.hagerco.com.
 - c. Reese Enterprises, Inc.; www.reeseusa.com.
 - d. Zero International, Inc., an Allegion company: www.zerointernational.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- B. Rain Drip Guards:
 1. Provide drip guards at head of exterior doors where indicated.
 2. Drip guard shall be continuous across entire length of door.
 3. Provide non-corroding fasteners at all locations.

2.20 ELECTROMAGNETIC DOOR HOLDERS

- A. Manufacturers:
 1. Basis-of-Design: SEM 7840; LCN; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Architectural Builder's Hardware Mfg. Inc.: www.abhmfg.com.
 - b. Rixson; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Electromagnetic Door Holders: Complying with BHMA A156.15.
 1. Type: Wall mounted, single unit, standard duty, with strike plate attached to door.
 - a. Low-profile, recess mounted.

- b. Provide armature extensions as required to meet wall and hardware conditions and to maintain proper clearances and operation.
2. Holding Force, Standard Duty: 35 lbs-force, minimum.
3. Voltage: 24 VDC.
4. Fail safe; door released to close automatically when electrical current is interrupted.
5. Provide interface with fire detectors and fire-alarm system for fire-rated door assemblies.

2.21 FLOOR STOPS

- A. Manufacturers:
 1. Basis-of-Design: FS436; Ives; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
 - b. Hager Companies: www.hagerco.com.
 - c. Trimco: www.trimcohardware.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Floor Stops: Complying with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
 1. Type: Dome floor stop; heavy duty.
 2. Material: Aluminum housing with rubber insert.
 3. Provide risers as required to accommodate carpet and other floor finish installations.
 - a. Riser height: Coordinate with thicknesses of floor finish.

2.22 WALL STOPS

- A. Manufacturers:
 1. Basis-of-Design: WS402CCV; Ives; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
 - b. Hager Companies: www.hagerco.com.
 - c. Trimco: www.trimcohardware.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Wall Stops: Complying with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
 1. Provide wall stops to prevent damage to wall surface upon opening door.
 2. Type: Bumper, concave, wall stop.
 3. Material: Heavy duty cast brass housing with rubber insert.

2.23 REMOVABLE MULLIONS

- A. Manufacturers:
 1. Basis-of-Design: KR5654; Von Duprin; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Precision (phi); a Dormakaba Holding Inc. company: www.precisionhardware.com.
 - b. Sargent; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Hager Companies: www.hagerco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 3. Removable mullion manufacturer shall be the same as the exit device manufacturer.
- B. Removable Mullions: Easily removed mullions that provide single door performance in double door openings.
 1. Material: Steel.
 2. Provide complete with stabilizer hardware.
 3. Provide mullions with keyed top-mounting assembly.

- a. Mullions self-lock when reinstalled.
4. Provide UL Listed mullions at fire rated openings.
5. Provide all associated hardware, including spacer blocks and brackets, as required for a complete installation and to suit frame and floor conditions.

2.24 **ASTRAGALS**

- A. Manufacturers:
 1. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
 2. Hager Companies: www.hagerco.com.
 3. National Guard Products, Inc.: www.ngpinc.com.
 4. Reese Enterprises, Inc.; www.reeseusa.com.
 5. Zero International, Inc., an Allegion company: www.zerointernational.com.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Astragals - Overlapping: Complying with BHMA A156.22.
 1. Basis-of-Design: 158NA; National Guard Products, Inc.: www.ngpinc.com.
 - a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Where indicated, provide surface mounted overlapping astragal to cover space between pairs of doors for full door height.
 3. Type: Overlapping flat type, and with sealing gasket.
 4. Material: Aluminum, with santoprene weatherstripping.
 5. Comply with ASTM E283 for air infiltration.
 6. Comply with UL 10B and UL 10C for fire rated doors.
 7. Provide non-corroding fasteners at exterior locations.
- C. Astragal Seals: Complying with BHMA A156.22.
 1. Basis-of-Design: 115NA; National Guard Products, Inc.: www.ngpinc.com.
 - a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Where indicated, provide surface mounted astragal seals to cover or fill space between pairs of doors for full door height.
 3. Type: Split, two parts, and with sealing gasket.
 4. Material: Aluminum, with epdm weatherstripping.
 5. Comply with ASTM E283 for air infiltration.
 6. Comply with UL 10B and UL 10C for fire rated doors.
 7. Provide non-corroding fasteners at exterior locations.

2.25 **THRESHOLDS**

- A. Manufacturers:
 1. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
 2. Hager Companies: www.hagerco.com.
 3. National Guard Products, Inc: www.ngpinc.com.
 4. Reese Enterprises, Inc.; www.reeseusa.com.
 5. Zero International, Inc., an Allegion company: www.zerointernational.com.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Thresholds - Saddle: Complying with BHMA A156.21.
 1. Basis-of-Design - Standard Threshold: 425; National Guard Products, Inc.: www.ngpinc.com.
 - a. Where indicated provide an applied stop strip equal to 4N; National Guard Products, Inc.: www.ngpinc.com.

- b. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Basis-of-Design - Heavy Duty Threshold: 425HD; National Guard Products, Inc.: www.ngpinc.com.
 - a. Where indicated provide an applied stop strip equal to 4N; National Guard Products, Inc.: www.ngpinc.com.
 - b. Provide either the named product or a comparable product by one of the other manufacturers specified.
 3. Provide threshold at each exterior door, unless otherwise indicated.
 4. Type: Saddle.
 - a. Provide heavy duty threshold; 10,000 pound load test.
 5. Material: Aluminum.
 6. Threshold Surface: Fluted horizontal grooves across full width.
 7. Comply with ICC A117.1 for barrier free threshold requirements.
 8. Stop Strip: Where indicated, provide an applied stop strip.
 - a. Weatherstripping material: Santoprene.
 - b. Comply with ASTM E283 for air infiltration.
 9. Field cut threshold to profile of frame and width of door sill for tight fit.
 10. Provide non-corroding fasteners at all locations.
- C. Thresholds - With integrated stop strip: Complying with BHMA A156.21.
1. Basis-of-Design - Standard Threshold: 896-N; National Guard Products, Inc.: www.ngpinc.com.
 - a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Basis-of-Design - Heavy Duty Threshold: 896HD-N; National Guard Products, Inc.: www.ngpinc.com.
 - a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 3. Provide threshold at each exterior door, unless otherwise indicated.
 4. Type: Threshold with integrated stop strip.
 - a. Provide heavy duty threshold; 10,000 pound load test.
 5. Material: Aluminum, with santoprene weatherstripping.
 6. Comply with ICC A117.1 for barrier free threshold requirements.
 7. Comply with ASTM E283 for air infiltration.
 8. Threshold Surface: Fluted horizontal grooves across full width.
 9. Field cut threshold to profile of frame and width of door sill for tight fit.
 10. Provide non-corroding fasteners at all locations.

2.26 WEATHERSTRIPPING AND GASKETING

- A. Manufacturers:
1. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
 2. Hager Companies: www.hagerco.com.
 3. National Guard Products, Inc: www.ngpinc.com.
 4. Reese Enterprises, Inc.; www.reeseusa.com.
 5. Zero International, Inc., an Allegion company: www.zerointernational.com.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Weatherstripping: Complying with BHMA A156.22.
1. Basis-of-Design: 700NA; National Guard Products, Inc.: www.ngpinc.com.

- a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Head and Jamb Type: Encased in retainer.
 3. Material: Aluminum, with neoprene weatherstripping
 4. Comply with ASTM E283 for air infiltration.
 5. Comply with UL 10B and UL 10C for fire rated doors.
 6. Provide weatherstripping on each exterior door at head and jambs, unless otherwise indicated. Weatherstripping shall be continuous without gaps.
- C. Fire and Smoke Gasketing: Complying with BHMA A156.22.
1. Basis-of-Design: 5050C; National Guard Products, Inc.: www.ngpinc.com.
 - a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Head and Jamb Type: Self-adhesive.
 3. Material: Silicone bulb gasketing.
 4. Comply with ASTM E283 for air infiltration.
 5. Comply with UL 10B and UL 10C for fire rated doors.
 6. Provide gasketing on each fire or smoke rated door at head and jambs, unless otherwise indicated. Gasketing shall be continuous without gaps.
- D. Sound and/or Light Seals: Complying with BHMA A156.22.
1. Basis-of-Design: 700NA plus 5025C; National Guard Products, Inc.: www.ngpinc.com.
 - a. Provide either the named products or a comparable product by one of the other manufacturers specified.
 2. Head and Jamb Type: Encased in retainer plus self-adhesive type.
 3. Material: Aluminum, with neoprene weatherstripping, plus TPE double batwing seal.
 4. Provide sound and/or light gasketing where indicated. Gasketing shall be continuous without gaps.

2.27 SWEEPS, DOOR BOTTOMS, AND SHOES

- A. Manufacturers:
1. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
 2. Hager Companies: www.hagerco.com.
 3. National Guard Products, Inc: www.ngpinc.com.
 4. Reese Enterprises, Inc.; www.reeseusa.com.
 5. Zero International, Inc., an Allegion company: www.zerointernational.com.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Bottom Sweeps: Complying with BHMA A156.22.
1. Basis-of-Design: 200NA; National Guard Products, Inc.: www.ngpinc.com.
 - a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Door Sweep Type: Encased in retainer.
 3. Material: Aluminum, with neoprene weatherstripping
 4. Comply with ASTM E283 for air infiltration.
 5. Comply with UL 10B and UL 10C for fire rated doors.
 6. Bottom sweep shall be continuous across entire length of door bottom.
 7. Provide door bottom sweep on each exterior door, unless otherwise indicated.
 8. Provide non-corroding fasteners at all locations.
- C. Automatic Door Bottoms: Complying with BHMA A156.22.
1. Basis-of-Design: 220NA; National Guard Products, Inc.: www.ngpinc.com.

- a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Automatic Door Bottom Type: Surface mounted automatic, encased in retainer.
 3. Material: Aluminum, with neoprene weatherstripping
 4. Comply with ASTM E283 for air infiltration.
 5. Comply with UL 10B and UL 10C for fire rated doors.
 6. Automatic door bottom shall be continuous across entire length of door bottom.
 7. Provide automatic door bottom on exterior doors where indicated.
 8. Provide non-corroding fasteners at all locations.
- D. Door Shoes: Complying with BHMA A156.22.
1. Basis-of-Design: 118N; National Guard Products, Inc.: www.ngpinc.com.
 - a. Provide either the named product or a comparable product by one of the other manufacturers specified.
 2. Door Sweep Type: Door shoe with drip cap.
 3. Material: Aluminum, with neoprene weatherstripping
 4. Comply with ASTM E283 for air infiltration.
 5. Comply with UL 10B and UL 10C for fire rated doors.
 6. Door shoe shall be continuous across entire length of door bottom.
 7. Provide door shoe on exterior doors where indicated.
 8. Provide non-corroding fasteners at all locations.

2.28 ELECTRIC POWER TRANSFERS

- A. Manufacturers:
1. Basis-of-Design: EPT-10; Von Duprin; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. Hager Companies: www.hagerco.com.
 - b. Securitron; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Electrified Power Transfer: Provide concealed mortised electric power and data transfer device; provides connection between frame and door with sufficient number and gage of conductors to accommodate function of hardware specified.
1. Material: Aluminum or steel.

2.29 DOOR POSITION SWITCHES

- A. Manufacturers:
1. Basis-of-Design: 679 Series; Schlage; an Allegion company: www.us.allegion.com.
 2. Other acceptable manufacturers:
 - a. GE Interlogix: www.interlogix.com.
 - b. Securitron; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Door Position Switches: Concealed magnetic door position switches used to detect the open or closed status of doors.
1. Power: 24 VDC.
 - a. Provide power supplies by same manufacturer as locking device.
 2. SPDT; single pole, double throw.

2.30 KEY CONTROL SYSTEMS

- A. Manufacturers:
1. Key control system manufacturer shall be the same as the core manufacturer.
 2. Match existing key control system using same manufacturer as existing system.

- B. Key Control Systems: Complying with guidelines of BHMA A156.28.
 - 1. Provide keying information in compliance with DHI (KSN) standards.
 - 2. Hardware Supplier shall meet with Owner to finalize master keying system requirements and obtain any special keying instructions.
 - 3. Keying: Grand master keyed.
 - 4. Include construction keying.
 - 5. Key to existing keying system.
 - 6. Supply keys in following quantities:
 - a. Change Keys per cylinder or keyed alike group; 3.
 - b. Master Keys; 2 per master key group.
 - c. Grand Master Key; 2 per grand master key group.
 - d. Construction Core Keys per cylinder or keyed alike group; 2.

2.31 EXIT MOTION SENSOR

- A. Manufacturers:
 - 1. Basis-of-Design: Scan II; Schlage; an Allegion company: www.us.allegion.com.
 - 2. Other acceptable manufacturers:
 - a. Hager Companies: www.hagerco.com.
 - b. Securitron; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Exit Motion Sensor (Request to Exit): Interior passive infrared detection device to initiate door release of exit door magnetic lock.
 - 1. Complies with UL 294.
 - 2. Power: 24 VDC.
 - 3. Provide adjustable detector face to allow for precise pattern configurations, and easy pattern adjustment.
 - 4. Provide adjustable relay latch time up to 60 seconds.
 - 5. Provide relay that operates before transistor to prevent false alarms.
 - 6. Operating Temperature: -20 to 120 degrees F.

2.32 POWER SUPPLY

- A. Manufacturers:
 - 1. Basis-of-Design: PS900 Series; Schlage; an Allegion company: www.us.allegion.com.
 - 2. Other acceptable manufacturers:
 - a. Hager Companies: www.hagerco.com.
 - b. Securitron; an Assa Abloy Group company: www.assaabloydss.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Power Supply: Steel enclosure, hard wired.
 - 1. UL 294 certified; Class 2 rated.
 - 2. Converts 120 VAC power to 24 VDC.
 - a. VDC power is regulated and filtered.
 - 3. Amps: 4, unless otherwise required by number of devices being connected.
 - 4. Distribution Boards: Unless otherwise required by number of devices being connected, provide the following:
 - a. Boards in Power Supply: 1
 - b. Output Relays per Board: 8, fuse-protected.
 - 5. Provide emergency interface relay that integrates with building's fire alarm system and will cut power to devices during an emergency.

6. Provide battery back-up function that will provide back-up power for four hours during power outages.

2.33 FINISHES

- A. Finishes: Identified in Section 08 7100.01 - Door Hardware Sets.
- B. Comply with BHMA A156.18.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of correct characteristics.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Install hardware for smoke and draft control doors in accordance with NFPA 105.
- D. Use templates provided by hardware item manufacturer.
- E. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
 1. For Steel Doors and Frames: Install in compliance with DHI (LOCS) recommendations.
 2. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
 3. Mounting heights in compliance with ADA Standards:
- F. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 01 4000 - Quality Requirements.
- B. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.
 1. AHC shall be provided by Contractor.
 2. AHC shall provide a written inspection report.

3.04 ADJUSTING

- A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

- A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

DOOR HARDWARE
08 7100-22

SECTION 08 8000 - GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Monolithic glazing.
- B. Insulating glass.
- C. Fire rated glazing.
- D. Plastic sheet glazing units.
- E. Glazing compounds and accessories.

1.02 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems 2016.
- E. ASTM C1184 - Standard Specification for Structural Silicone Sealants 2018, with Editorial Revision.
- F. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants 2015.
- G. ASTM C1311 - Standard Specification for Solvent Release Sealants 2014.
- H. ASTM C1401 - Standard Guide for Structural Sealant Glazing 2014.
- I. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015.
- J. ASTM C793 - Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants 2005 (Reapproved 2017).
- K. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2015).
- L. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- M. ASTM C1036 - Standard Specification for Flat Glass 2016.
- N. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- O. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass 2014.
- P. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- Q. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2015.
- R. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2019.
- S. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- T. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2010.
- U. GANA (GM) - GANA Glazing Manual 2008.
- V. GANA (SM) - GANA Sealant Manual 2008.
- W. GANA (LGRM) - Laminated Glazing Reference Manual 2009.
- X. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Y. IGMA TB-3001 - Guidelines for Sloped Glazing 2001.

- Z. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).
- AA. NFPA 251 - Standard Methods of Tests of Fire Resistance of Building Construction and Materials - 2006.
- BB. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.
- CC. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies 2017.
- DD. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- EE. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2017.
- FF. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2014, with Errata (2017).
- GG. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2017.
- HH. UL 9 - Standard for Fire Tests of Window Assemblies Current Edition, Including All Revisions.
- II. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- JJ. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- KK. UL 263 - Standard for Fire Tests of Building Construction and Materials Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glazing. Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit three samples 12 by 12 inch in size for each glass type.
 - 1. Non-insulated types may be 4 by 4 inches in size.
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), IGMA TM-3000, and IGMA TB-3001 for glazing installation methods.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years documented experience.

1.06 MOCK-UPS

- A. See Section 01 4000 - Quality Requirements, for additional mock-up requirements.
- B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Install glazing in mockups specified in:
 - a. Section 08 4313 - Aluminum-Framed Storefronts.
 - b. Section 08 4413 - Glazed Aluminum Curtain Walls.
 - c. Section 08 6300 - Metal-Framed Skylights.

- C. Mock-ups may remain as part of the Work.

1.07 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- C. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.
- D. Coated Glass: Provide a ten (10) year manufacturer warranty to include coverage for peeling, cracking, and other indications of deterioration in coating, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. Guardian Glass, LLC: www.guardianglass.com.
 - 2. Pilkington North America Inc: www.pilkington.com.
 - 3. Viracon, Inc: www.viracon.com.
 - 4. Vitro Architectural Glass (formerly PPG Industries, Inc.): www.vitroglazings.com.
 - 5. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Laminated Glass Manufacturers:
 - 1. Any of the manufacturers specified for float glass.
- C. Insulating Glass Manufacturers:
 - 1. Any of the manufacturers specified for float glass.
- D. Fire Rated Glass Manufacturers:
 - 1. SAFTIFIRST, a division of O'Keeffe's Inc.; www.safti.com.
 - 2. Schott Corporation: www.us.schott.com
 - 3. Technical Glass Products (TGP); www.fireglass.com.
 - 4. Vetrotech Saint-Gobain North America; www.vetrotech.com.
 - 5. Substitutions: Refer to Section 01 6000 - Product Requirements.
- E. One-Way Mirrored Glass Manufacturers:
 - 1. Pilkington North America Inc: www.pilkington.com.
 - 2. Substitutions: Refer to Section 01 6000 - Product Requirements.
- F. Plastic Sheet Glazing Manufacturers:
 - 1. Palram; SUNLITE, Type PALSUN: www.palram.com
 - 2. Plazit Polygal, the Plastic Sheets Group; Monogal: www.polygal-northamerica.com
 - 3. SABIC Innovative Plastics US LLC; LEXAN Solid Sheet: www.sabic.com/sfs
 - 4. Substitutions: Refer to Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Exterior Glazing Assemblies:
 - 1. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - a. Design Pressure: Calculated in accordance with ASCE 7 applicable codes, and as indicated on Drawings..
 - b. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.

- 1) 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 the short side length or 1 inch, whichever is less.
- c. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
- d. Glass thicknesses listed are minimum.
2. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
 - a. In conjunction with vapor retarder and joint sealer materials described in other Division 7 sections.
3. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - a. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - b. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - c. Solar Optical Properties: Comply with NFRC 300 test method.
- B. Probability of Breakage: Design glass for a probability of breakage not greater than 0.008 (8 lites per 1000) for glass not more than 15 degrees from vertical.
- C. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Insulating Glass:
 1. Insulating Glass Certification Program: Provide insulating glass units that are certified by the Insulating Glass Certification Council (IGCC).
 - a. Provide permanent markings with appropriate certification label of IGCC on either the spacer or one lite of each insulated unit.
- E. Safety Glazing:
 1. Complies with ANSI Z97.1 and 16 CFR 1201; test requirements for Class A/Category II.
 2. Markings for Safety Rated Glazing: Provide permanent markings on safety-rated glazing in compliance with applicable safety glazing standards, ICC (IBC), local building code, and authorities having jurisdiction.
- F. Fire Rated Glazing:
 1. Fire-Protection-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire protection ratings indicated; tested in accordance with NFPA 80, NFPA 252, NFPA 257, UL 9, UL 10B, and UL 10C.
 - a. Fire protection rated glazing with a 20 minute rating shall be exempt from the hose-stream test.
 2. Fire-Resistance-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire protection ratings indicated; tested in accordance with ASTM E119, NFPA 80, NFPA 251, NFPA 252, NFPA 257, UL 9, UL 10B, UL 10C, and UL 263.
 3. Labeling: Provide permanent markings on fire rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction.
 - a. "W" Label: Meets wall assembly criteria of ASTM E119 or UL 263 fire test standards.
 - b. "OH" Label: Meets fire window assembly criteria including hose stream test of NFPA 257 or UL 9 fire test standards.
 - c. "D" Label: Meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
 - d. "H" Label: Meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire test standards.

- e. "T" Label: Meets temperature rise of not more than 450 degrees F above ambient at end of 30 minutes fire exposure in accordance with NFPA 252, UL 10B, or UL 10C fire test standards.
- f. "XXX" Label - Placeholder that represents fire protection or fire resistance rating period, in minutes.
- 4. Accessories:
 - a. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with fire rated glazing and each other, and that are approved for use with fire rated glazing by testing agencies that listed and labeled fire rated glazing.
- G. Glass Thickness: Indicated glass thicknesses are minimums. Provide glass that complies with performance requirements and load designs, and is not less than the thickness indicated.
- H. Glass Strength:
 - 1. Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with performance requirements.
 - 2. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with performance requirements.
- I. Glass Distortion Tolerances:
 - 1. Roller Wave: Maximum 0.003 (0.076 mm) from peak to valley within the main body of the sheet and maximum 0.008 (0.2 mm) within 10.5 inches of a leading or trailing edge.
 - 2. Localized Warp: Maximum 0.03 inch (0.8 mm) over any 12 inch (305 mm) span, but limited to 0.31 inch (8 mm).

2.03 FLOAT GLASS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
 - 2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 - 3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 - 4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - 5. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
 - a. Glass Tints: Provide the following:
 - 1) Color: Green.
 - (a) Basis-of-Design Product: Guardian Glass, LLC; SunGuard Green, or a comparable product from any of the manufacturers specified for float glass.

2.04 LAMINATED GLASS

- A. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 - 1. Unless otherwise indicated laminate glass shall consist of two plies of clear annealed float glass with a polyvinyl butyral interlayer.
 - a. Minimum Thickness of Each Glass Ply: 1/8 inch (3 mm), unless otherwise indicated.
 - b. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum, unless otherwise indicated.
 - 1) Interlayer Color: Clear, unless otherwise indicated.

2.05 INSULATING GLASS

- A. General: Unless otherwise noted, Insulating Glass Unit Types shall comply with the following:
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO.
 - a. Low-E Coating:
 - 1) Basis-of-Design Product: Guardian Glass, LLC; SNX 62/27, or a comparable product from any of the manufacturers specified for float glass.

3. Perimeter Spacer: Warm-edge spacer.
 - a. Manufacturer's standard low conductivity polymer, stainless steel, or hybrid material.
 - 1) Spacer Color: Gray.
 - 2) Spacer Width: As required for specified insulating glass unit.
 - 3) Products:
 - (a) Quanex IG Systems, Inc; Super Spacer Premium Enhanced: www.quanex.com.
 - (b) Technoform Glass Insulation; TGI-Spacer: www.glassinsulation.us.
 - (c) Viracon, Inc; ExtremEdge: www.viracon.com.
 - (d) Vitro Architectural Glass (Formerly PPG); Intercept Spacer System: www.vitroglazings.com.
 - (e) Substitutions: Refer to Section 01 6000 - Product Requirements.
4. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene or acrylic adhesive or spacer manufacturer's standard sealant as primary seal applied between spacer and glass panes, and butyl sealant as secondary seal applied around perimeter.
 - b. Color: Black.
5. Purge interpane space with dry air, hermetically sealed.
 - a. Fill space between lites with argon unless otherwise indicated.
 - 1) 95 percent argon, 5 percent air.

2.06 SPANDREL GLASS

- A. Silicone-Coated Spandrel Glass: ASTM C1048, Type I, Condition C, Quality-Q3.
 1. Spandrel (Opacifying) Coating: One-component, water-based, UV resistant, silicone coating. Applied coating will cure to a tack-free silicone elastomeric film providing opacification in any color to glass. Coating shall be applied at a minimum thickness of 4-5 mils dry.
 2. Product:
 - a. Opaci-Coat 300; ICD High Performance Coatings; www.icdcoatings.com .
 - 1) Color: #2-3548 Valley Mist; complimenting Basis-of-Design tint.
 - (a) If glass tint other than Basis-of-Design is provided, revise spandrel coating color, subject to Architect's approval, to compliment provided glass tint.

2.07 FIRE RATED GLASS

- A. Fire-Protection-Rated Glazing - 20 Minute: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire-rating period.
 1. Glass Type: Specialty tempered float glass.
 2. Meet safety glazing requirements indicated in performance requirements.
 3. Meet fire door assembly criteria for a "D" label as indicated in the performance requirements.
 4. Glazing Method: As required for fire rating.
 5. Fire-Rating: 20 minutes.
 6. Products: Provide one of the following products or a comparable product from one of the other manufacturers specified for fire rated glass.
 - a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite I: www.safti.com.
 - b. Technical Glass Products; Fireglass20: www.fireglass.com.
 - c. Vetrotech Saint-Gobain North America; Pyroswiss 20: www.vetrotechusa.com.
- B. Fire-Protection-Rated Glazing For Door Lites: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire-rating period.
 1. Glass Type: Specialty tempered float glass.
 2. Meet safety glazing requirements indicated in performance requirements.
 3. Meet fire door assembly criteria for "D", and "H" labels as indicated in the performance requirements.

4. Glazing Method: As required for fire rating.
 5. Fire-Rating: As indicated.
 6. Products: Provide one of the following products or a comparable product from one of the other manufacturers specified for fire rated glass.
 - a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite X: www.safti.com.
- C. Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire-rating period.
1. Glass Type: Laminated ceramic glass.
 - a. Neutral color, free of amber tint.
 2. Meet safety glazing requirements indicated in performance requirements.
 3. Meet fire door assembly criteria for "D", and "H" labels as indicated in the performance requirements.
 4. Meet fire window assembly criteria for "W" and "OH" labels as indicated in the performance requirements.
 5. Glazing Method: As required for fire rating.
 6. Fire-Rating: As indicated.
 7. Products: Provide one of the following products or a comparable product from one of the other manufacturers specified for fire rated glass.
 - a. SAFTIFIRST, a division of O'Keeffe's Inc; Pyran Platinum L: www.safti.com.
 - b. SCHOTT North America Inc; Pyran Platinum L: www.us.schott.com.
 - c. Technical Glass Products; FireLite Plus: www.fireglass.com.
 - d. Vetrotech Saint-Gobain North America; Keralite L: www.vetrotechusa.com.
- D. 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.
1. Glass Type: Multi-laminate annealed glass with intumescent fire retardant interlayers.
 2. Meet safety glazing requirements indicated in performance requirements.
 3. Meet fire door assembly criteria for "D", and "H" labels as indicated in the performance requirements.
 4. Meet fire window assembly criteria for "W" and "OH" labels as indicated in the performance requirements.
 5. Meet temperature rise criteria for "T" label as indicated in the performance requirements.
 6. Glazing Method: As required for fire rating.
 7. Fire-Rating: As indicated.
 8. Products: Provide one of the following products or a comparable product from one of the other manufacturers specified for fire rated glass.
 - a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite II-XL : www.safti.com/sle.
 - b. Technical Glass Products; Pilkington Pyrostop : www.fireglass.com.
 - c. Vetrotech Saint-Gobain North America; Contraflam : www.vetrotechusa.com

2.08 ONE-WAY MIRRORED GLASS

- A. One-Way Mirrored Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) type coatings on flat glass; coated vision glass, Kind CV.
1. Allows privacy with clear vision into observed space.
 2. Light Level Ratio: 8:1 from bright (subject) side to dark (observer) side.
 3. Mirrored coating toward subject-side.
 4. Glass Tint: Gray.
 5. Visible Transmittance: 11 percent.
 6. Visible Reflectance - Coated Side: 68 percent.
 7. Visible Reflectance - Glass Side: 16 percent.

2.09 GLAZING COMPOUNDS

- A. Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag, butyl sealant.
1. Product:
 - a. Pecora Corp.; BC-158: www.pecora.com.

- b. Tremco, Inc.; Butyl Sealant: www.tremcosealants.com.
- c. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. General Glazing Silicone Sealant: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 25 or 50, Use NT.
 1. Products:
 - a. Dow Corning Corporation; 899 Silicone Glazing Sealant: www.dowcorning.com.
 - b. GE/Momentive Performance Materials, Inc: SCS2800 SilGlaz II: www.siliconeforbuilding.com
 - c. Pecora Corporation: 896: www.pecora.com.
 - d. Tremco, Inc.: Spectrem 2: www.tremcosealants.com.
 - e. Substitutions: Refer to Section 01 6000 - Product Requirements.
 2. Color: Black.
- C. Structural Sealant Glazing (SSG) Adhesive: Neutral curing, silicone sealant formulated for SSG applications in compliance with ASTM C1184 and structural glazing industry guidelines, ASTM C1401.
 1. SSG adhesive in compliance with ASTM C920; Type S - Single-component, Grade NS, Class 25, Use NT, G, and A.
 2. Ultimate Tensile Strength: Minimum of 50 psi as determined by test method ASTM C1135 under the following conditions.
 - a. Exposure to air temperatures of 190 degrees F and minus 20 degrees F.
 - b. Water immersion for seven (7) days, minimum.
 - c. Exposure to weathering for 5,000 hours, minimum.
 3. Sealant Design Tensile Strength: 20 psi, maximum.
 4. Hardness: 20 to 60 with Type A-2 durometer in compliance with test method ASTM C661.
 5. Color: Black.
 6. SSG sealant tested for compatibility with glazing accessories in compliance with ASTM C1087, tested for accelerated weathering in compliance with ASTM C793, and in compliance with insulating glass secondary sealant design standards of ASTM C1249.
 7. Products:
 - a. Dow Corning Corporation; 995 Structural Glazing Sealant: www.dowcorning.com .
 - b. GE/Momentive Performance Materials, Inc: SSG4000 UltraGlaze: www.siliconeforbuilding.com.
 - c. Pecora Corporation: 895NST: www.pecora.com.
 - d. Sika; SikaSil SG-20: www.sika.com.
 - e. Tremco, Inc.: Proglaze SSG: www.tremcosealants.com.
 - f. Substitutions: Refer to Section 01 6000 - Product Requirements.

2.10 ACCESSORIES

- A. Setting Blocks: EPDM or neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: EPDM or neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
 1. Width: As required for application.
 2. Thickness: As required for application.
- D. Glazing Gaskets and Splines: Resilient EPDM or polyvinyl chloride extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.

2.11 VISION LITE KITS FOR FIRE RATED DOOR GLAZING

- A. At Contractor's option, instead of glass stops provided by door manufacturers, provide fire rated glass manufacturer's standard vision lite kits for installing fire-rated glass in doors.
 - 1. Moldings: Minimum 20 gage, 0.036 inch, thick steel.
 - 2. Profile: Manufacturer's standard profiles.
 - 3. Door Lite Sizes: As indicated on Drawings.
 - 4. Fire Ratings: As indicated on Drawings.
 - 5. Finish: Manufacturer's standard primer.
 - 6. Basis-of-Design Product: Provide SAFTIFIRST, a division of O'Keeffe's Inc.; Vision Kits: www.safti.com, or a comparable product from any of the manufacturers specified for fire-rated glass.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- C. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Use one or more of the specified glazing methods as recommended by GANA, glass manufacturer, and installer, and as required to comply with performance requirements.
- C. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- D. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- E. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- F. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- G. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape or spline to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- F. Carefully trim protruding tape with knife.

3.06 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

3.07 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Place setting blocks at 1/4 points and install glazing pane or unit.
- C. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
- D. Fill gaps between glazing and stops with silicone type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.08 INSTALLATION - WET GLAZING METHOD (COMPOUND AND COMPOUND)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
- C. Locate and secure glazing pane using glazers' clips.
- D. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.09 INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

- F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
 - 1. Place glazing tape on glazing pane of unit with tape 1/4 inch below sight line.
- G. Fill gap between glazing and stop with silicone type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
- H. Apply cap bead of silicone type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.10 **INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)**

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
- F. Fill gaps between pane and applied stop with silicone type sealant to depth equal to bite on glazing, to uniform and level line.
- G. Carefully trim protruding tape with knife.

3.11 **INSTALLATION - STRUCTURAL SILICONE GLAZING**

- A. Refer to Section 04 4313 for wall framing assembly requirements.
- B. Refer to Section 08 4413 for wall framing assembly requirements.
- C. Application - Field Glazed: Follow basic guidelines of structural silicone glazing for glazing application.
 - 1. Two-Sided Structural: Glass structurally adhered to vertical mullions with horizontal sides captured in glazing pockets.
- D. Provide design review of the glazing system and project details, adhesion testing, proper surface preparation, training and a quality service program.
- E. Provide only structural silicone sealant, tested and manufactured for structural glazing.
- F. Prevent structural silicone sealant from blocking weep systems.

3.12 **INSTALLATION - FIRE-RATED GLAZING UNITS**

- A. Install fire-rated glazing in compliance with written instructions of fire-rated glazing manufacturer as required to maintain specified fire rating.
 - 1. Use glazing method and materials as indicated by the fire rated glazing manufacturer as required to maintain specified fire-rating.

3.13 **CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.14 **PROTECTION**

- A. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

3.15 **GLASS SCHEDULE**

- A. GL-1: Low-E-coated, tinted, laminated insulating safety glass.
 - 1. Overall Unit Thickness: 1 inch.

2. Outdoor Lite: Tinted annealed float glass.
 - a. Minimum Thickness: 1/4 inch (6 mm).
 - b. Tint Color: Green.
 3. Airspace:
 - a. Width: 7/16 inch.
 - b. Interspace Content: Argon.
 4. Indoor Lite: Clear laminated float glass.
 - a. Overall Thickness: 5/16 inch (8 mm).
 - b. Low-E Coating: On 3rd surface.
 - c. Minimum Thickness of Each Glass Ply: 1/8 inch (3mm).
 - d. Interlayer Thickness: 0.300 inch (0.76mm).
 - e. PVB Interlayer Color: Clear.
 5. Performance:
 - a. Winter Nighttime U-Factor: 0.29 maximum.
 - b. Visible Light Transmittance: 52 percent minimum.
 - c. Solar Heat Gain Coefficient: 0.25 maximum.
- B. GL-2: Low_E_coated, tinted, tempered insulating safety glass.
1. Overall Unit Thickness: 1 inch.
 2. Outdoor Lite: Tinted fully tempered float glass.
 - a. Minimum Thickness: 1/4 inch (6 mm).
 - b. Tint Color: Green.
 - c. Safety glazing required.
 3. Airspace:
 - a. Width: 1/2 inch.
 - b. Interspace Content: Argon.
 4. Indoor Lite: Clear fully tempered float glass.
 - a. Overall Thickness: 1/4 inch (6 mm).
 - b. Low-E Coating: On 3rd surface.
 - c. Safety glazing required.
 5. Performance:
 - a. Winter Nighttime U-Factor: 0.29 maximum.
 - b. Visible Light Transmittance: 52 percent minimum.
 - c. Solar Heat Gain Coefficient: 0.25 maximum.
- C. GL-3: Translucent, Low-E-coated, tinted, laminated insulating safety glass.
1. Overall Unit Thickness: 1 inch.
 2. Outdoor Lite: Tinted annealed float glass.
 - a. Minimum Thickness: 1/4 inch (6 mm).
 - b. Tint Color: Green.
 3. Airspace:
 - a. Width: 7/16 inch.
 - b. Interspace Content: Argon.
 4. Indoor Lite: Clear laminated float glass.
 - a. Overall Thickness: 5/16 inch (8 mm).
 - b. Low-E Coating: On 3rd surface.
 - c. Minimum Thickness of Each Glass Ply: 1/8 inch (3mm).
 - d. Interlayer Thickness: 0.300 inch (0.76mm).
 - e. PVB Interlayer Color: Vanceva Cool White 000A.
 5. Performance:
 - a. Winter Nighttime U-Factor: 0.29 maximum.
 - b. Visible Light Transmittance: 39 percent minimum.
 - c. Solar Heat Gain Coefficient: 0.24 maximum.

- D. GL-4: Translucent, Low-E-coated, tinted, laminated insulating safety glass.
 - 1. Overall Unit Thickness: 1 inch.
 - 2. Outdoor Lite: Tinted annealed float glass.
 - a. Minimum Thickness: 1/4 inch (6 mm).
 - b. Tint Color: Green.
 - 3. Airspace:
 - a. Width: 7/16 inch.
 - b. Interspace Content: Argon.
 - 4. Indoor Lite: Clear laminated float glass.
 - a. Overall Thickness: 5/16 inch (8 mm).
 - b. Low-E Coating: On 3rd surface.
 - c. Minimum Thickness of Each Glass Ply: 1/8 inch (3mm).
 - d. Interlayer Thickness: 0.300 inch (0.76mm).
 - e. PVB Interlayer Color: Vanceva Artic Snow 0009.
 - 5. Performance:
 - a. Winter Nighttime U-Factor: 0.29 maximum.
 - b. Visible Light Transmittance: 31 percent minimum.
 - c. Solar Heat Gain Coefficient: 0.23 maximum.
- E. GL-5: Tinted insulating spandrel glass.
 - 1. Overall Unit Thickness: 1 inch.
 - 2. Outdoor Lite: Tinted heat-strengthened float glass.
 - a. Minimum Thickness: 1/4 inch (6 mm).
 - b. Tint Color: Green.
 - 3. Airspace:
 - a. Width: 1/2 inch.
 - b. Interspace Content: Argon.
 - 4. Indoor Lite: Clear heat-strengthened float glass.
 - a. Minimum Thickness: 1/4 inch (6 mm).
 - b. Silicone Spandrel Coating: 4th surface
 - 1) Color: Green to compliment Outdoor Lite.
 - 5. Performance:
 - a. Winter Nighttime U-Factor: 0.45 maximum.
 - b. Visible Light Transmittance: 52 percent minimum.
 - c. Solar Heat Gain Coefficient: 0.25 maximum.
- F. GL-6: 45 minute fire-protection-rated glazing (for Door Lites only).
 - 1. Specialty tempered float glass.
 - 2. Thickness: 3/4 inch.
 - 3. Fire Rating: 45 minutes.
- G. GL-7: Clear Laminated Safety Glass.
 - 1. Two Plies of Clear annealed float glass
 - 2. Minimum Overall Thickness: 1/4 inch (6 mm).
 - 3. Safety glazing required.
 - 4. PVB Interlayer Color: Clear.
 - 5. Interlayer Thickness: 0.0600 inch (1.52mm).
- H. GL-8: Clear Monolithic Safety Glass.
 - 1. Clear fully tempered safety glass.
 - 2. Minimum Thickness: 1/4 inch (6 mm).
 - 3. Safety glazing required.
- I. GL-9: Annealed, clear float glass.
 - 1. Clear annealed float glass.
 - 2. Minimum Thickness: 1/4 inch (6 mm).

- J. GL-10: Polycarbonate Flat Sheet glazing
 - 1. Applications: Door Lite locations as indicated on drawings.
 - 2. Type: Monolithic (single layer solid) sheet.
 - 3. Silicone abrasion resistant coating for scratch resistance.
 - 4. Tint: Clear, transparent.
 - 5. Thickness: 0.236 inch.
 - 6. Width: 48 inch.
 - 7. Visible Light Transmittance (VLT): 80 percent, minimum.
 - 8. Glazing Method: As required for application indicated on drawings.
- K. GL-11: Colored Laminated Safety Glass - Color A.
 - 1. Two Plies of Clear annealed float glass
 - 2. Minimum Overall Thickness: 1/4 inch (6 mm).
 - 3. Safety glazing required.
 - 4. PVB Interlayer Color: Color A - To Be Selected by Architect.
 - 5. Interlayer Thickness: 0.0600 inch (1.52mm).
- L. GL-12: Colored Laminated Safety Glass - Color B.
 - 1. Two Plies of Clear annealed float glass
 - 2. Minimum Overall Thickness: 1/4 inch (6 mm).
 - 3. Safety glazing required.
 - 4. PVB Interlayer Color: Color B - To Be Selected by Architect.
 - 5. Interlayer Thickness: 0.0600 inch (1.52mm).
- M. GL-13: Colored Laminated Safety Glass - Color C.
 - 1. Two Plies of Clear annealed float glass
 - 2. Minimum Overall Thickness: 1/4 inch (6 mm).
 - 3. Safety glazing required.
 - 4. PVB Interlayer Color: Vanceva Artic Snow 0009.
 - 5. Interlayer Thickness: 0.3000 inch (1.52mm).
- N. GL-14: Colored Laminated Safety Glass - Color D.
 - 1. Two Plies of Clear annealed float glass
 - 2. Minimum Overall Thickness: 1/4 inch (6 mm).
 - 3. Safety glazing required.
 - 4. PVB Interlayer Color: Color D - To Be Selected by Architect.
 - 5. Interlayer Thickness: 0.0600 inch (1.52mm).
- O. GL-15: Colored Laminated Safety Glass - Color E.
 - 1. Two Plies of Clear annealed float glass
 - 2. Minimum Overall Thickness: 1/4 inch (6 mm).
 - 3. Safety glazing required.
 - 4. PVB Interlayer Color: Color E - To Be Selected by Architect.
 - 5. Interlayer Thickness: 0.0600 inch (1.52mm).
- P. GL-16: One-way mirrored glass.
 - 1. Clear annealed float glass.
 - 2. Minimum Thickness: 1/4 inch (6 mm).

END OF SECTION

SECTION 08 8300 - MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass mirrors.
 - 1. Annealed float glass with safety backing.

1.02 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.
- C. ASTM C1036 - Standard Specification for Flat Glass 2016.
- D. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- E. GANA (GM) - GANA Glazing Manual 2008.
- F. GANA (SM) - GANA Sealant Manual 2008.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds: Submit chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Manufacturer's Certificate: Certify that mirrors, meets or exceeds specified requirements.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM) and GANA (SM) for glazing installation methods.
- B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

1.05 FIELD CONDITIONS

- A. Do not install mirrors when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.
- B. Mirror Glass; MG-1: ASTM C1036, Type 1 - Transparent Flat, Class 1 - Clear, Quality - Q1 (high-quality mirrors); silvering, protective coating, and quality requirements in compliance with ASTM C1503.
 - 1. Thickness: 1/4 inch.
 - 2. Edges: Flat polished, sealed.
 - 3. Size: As indicated on drawings.

2.02 FRAMING

- A. Framed - 4 Sides: Extruded aluminum J-trim with top mounting cleat and airspace behind mirror.
 - 1. Exposed Face: 13/32 inch.
 - 2. Corners: Mitered with tight joints.
 - a. Frame Screw Holes: Top and bottom.
 - 3. Finish: Satin anodized.
 - 4. Products:
 - a. C.R. Laurence Co., Inc.; custom framing: www.crlaurence.com.
 - 1) J-trim: Model D1680A.
 - 2) Top Cleat: Model D1637M.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Framed - Top and Bottom: Extruded aluminum J-trim with top mounting cleat and airspace behind mirror. Frameless sides. Bottom trim has raised rib to prevent moisture from being trapped in channel.
 - 1. Exposed Face: 5/16 inch.
 - 2. Finish: Satin anodized.
 - 3. Products:
 - a. C.R. Laurence Co., Inc.; Cleat Mount System, www.crlaurence.com.
 - 1) Top J-trim: Model D1638A.
 - 2) Top Cleat: Model D1637M.
 - 3) Bottom J-trim: D638A.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Mirror Clips: Top adjustable mounting clips and fixed bottom clips without an airspace behind mirror.
 - 1. Exposed Face: 1/4 inches.
 - 2. Finish: Nickel plated.
 - 3. Products:
 - a. C.R. Laurence Co., Inc.; Bishop Mirror Clips, www.crlaurence.com.
 - 1) 2-Piece Top Clip: Model SW5232/SW5233.
 - 2) Bottom Clip: SW6003
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. Safety Backing: Pressure-sensitive adhesive coated film with embedded woven scrim.
 - 1. Complies with ANSI Z97.1 and 16 CFR 1201; test requirements for Class A/Category II.
 - 2. Products:
 - a. 3M; Bidirectional Woven Copolymer Tape 960G; www.3m.com.
 - b. C.R. Laurence Co., Inc.; 2MT Series: www.crlaurence.com.
 - c. ShurTape Technologies, LLC; SS501 Shatterstop Safety Mirror Backing Tape: www.shurtape.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Mirror Adhesive: High strength adhesive that remains flexible and is compatible with safety backing; low VOC.
 - 1. Application Temperature: 60 to 100 degrees F at contact surfaces.
 - 2. Volatile Organic Content (VOC): Less than 250 g/L.
 - 3. Products:
 - a. Dow Corning Corporation; DOWSIL 817 Mirror Adhesive: www.dowcorning.com.
 - b. PPG Industries, Inc.; Liquid Nails Mirror Adhesive LN-730: www.liquidnails.com.
 - c. Royal Adhesives & Sealants, LLC; Gunther Premier Plus Mirror Mastic: www.royaladhesives.com.
 - d. Sika Corporation; Sikaflex-124 Mirror Grip: www.usa.sika.com
 - e. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces of mirror frames or recesses are clean, free of obstructions, and ready for installation of mirrors.

3.02 PREPARATION

- A. Clean contact surfaces and wipe dry.
- B. Properly prepare substrates for mirror adhesives according to adhesive manufacturer's instructions.

3.03 INSTALLATION

- A. Install mirrors in accordance with manufacturer's recommendations.
- B. Set mirrors plumb and level, and free of optical distortion.
- C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.
- D. Ensure that safety backing is applied over the entire surface of all mirror back sides.
- E. Framed - 4 Sides:
 - 1. Install according to framing manufacturer's instructions.
 - 2. Install concealed cleat to substrate at location of mirror top.
 - 3. Install bottom J-trim to substrate at location mirror bottom.
 - 4. Apply mirror adhesive to substrates; keep 4 inches away from mirror edges to allow air circulation.
 - a. Apply in vertical beads or patties.
 - 5. Position mirror in bottom J-trim, press firmly into adhesive and install side J-trim.
 - a. Other than adhesive, verify that air space behind mirror is clear and free of debris.
 - 6. Install top J-trim securely on cleat.
 - 7. Ensure that mirror is properly aligned and secured in framing without excessive movement or vibrations; secure four sides of framing to one another with concealed screws at the top and bottom of the framing.
- F. Framed - Top and Bottom:
 - 1. Install according to framing manufacturer's instructions.
 - 2. Install concealed cleat to substrate at location of mirror top.
 - 3. Install bottom J-trim to substrate at location of mirror bottom.
 - 4. Apply mirror adhesive to substrates; keep 4 inches away from mirror edges to allow air circulation.
 - a. Apply in vertical beads or patties.
 - 5. Position mirror in bottom J-trim and press firmly into adhesive.
 - a. Other than adhesive, verify that air space behind mirror is clear and free of debris.
 - 6. Install top J-trim on cleat; ensure that it snaps in place securely.
 - 7. Ensure that mirror is properly aligned and secured in framing without excessive movement or vibrations.
- G. Mirror Clips:
 - 1. Install according to clip manufacturer's instructions.
 - 2. Install bottom clips to substrate at location of mirror bottom.
 - a. Space clips as recommended by clip manufacturer but not more than 36 inches on center; minimum of 2 clips.
 - 3. Install clip receivers to substrate at location of mirror top.
 - a. Space clips as recommended by clip manufacturer but not more than 36 inches on center; minimum of 2 clips.
 - 4. Apply mirror adhesive to substrates; keep 4 inches away from mirror edges.
 - a. Apply in vertical beads or patties.
 - 5. Position mirror in bottom clips and press firmly into adhesive.
 - a. Adhesive shall be compressed to 1/16 inch thickness, maximum.
 - 6. Install top clips into receivers.

7. Ensure that mirror is properly aligned and secured by clips without excessive movement or vibrations.

3.04 CLEANING

- A. Remove labels after work is complete.
- B. Clean mirrors and adjacent surfaces.

END OF SECTION

SECTION 08 9100 - LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 08 1612 - FRP Faced Aluminum Doors and Frames: Frames to receive louvers.
- C. Section 08 4313 - Aluminum-Framed Storefronts: Prepared openings for louvers.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. AMCA 511 - Certified Ratings Program for Air Control Devices 2010.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.
- D. Samples: Submit three samples 4 by 4 inches in size illustrating finish and color of exterior and interior surfaces.
- E. Test Reports: Independent agency reports showing compliance with specified performance criteria.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least 5 years of documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
 - 1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Louvers - Drainable Blades:
 - 1. The Airolite Company, LLC; Model K6774: www.airolite.com.
 - 2. Arrow United Industries; Model EA-425-DD: www.arrowunited.com.
 - 3. Construction Specialties, Inc.; Model A4097: www.c-sgroup.com.
 - 4. Greenheck Fan Corporation; Model ESD-435: www.greenheck.com.
 - 5. Industrial Louvers, Inc.; Model 458XP: www.industriallouvers.com.

6. Ruskin; Model ELF375DX: www.ruskin.com.
7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf without damage or permanent deformation.
 2. Beginning point of water penetration at 0.01 oz/sq ft is 850 fpm, minimum.
 3. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
 4. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Stationary Louvers: Horizontal blade, extruded aluminum construction, with concealed intermediate mullions.
 1. Free Area: 50 percent, minimum.
 2. Blades: Drainable.
 3. Frame: 4 inches deep, channel profile; corner joints mitered.
 4. Aluminum Thickness: Frame 12 gage, 0.081 inch minimum; blades 12 gage, 0.081 inch minimum.
 5. Aluminum Finish: Superior performing organic coatings; finish welded units after fabrication.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T5 or T6 temper.

2.04 FINISHES

- A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.
 1. Color: Two or three-coat custom color to match Architect's sample.

2.05 ACCESSORIES

- A. Blank-Off Panels: Aluminum face and back sheets, polyisocyanurate foam core, 2 inch thick, painted black on exterior side; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.
- B. Screens: Frame of same material as louver, with mitered and welded corners; removable, screw attached; installed on inside face of louver frame.
- C. Bird Screen: Interwoven wire mesh of steel, 14 gage, 0.0641 inch diameter wire, 1/2 inch open weave, square design.
- D. Insect Screen: 18 x 16 size aluminum mesh.
- E. Fasteners and Anchors: Stainless steel.
- F. Flashings: Sheet aluminum, formed to required shape, single length in one piece per location.
 1. Comply with ASTM B209.
 2. Minimum Thickness: 0.032 inches thick.
 3. Includes, but is not limited to, the following:
 - a. Extended sill with drip edge.
- G. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Set sill members and sill flashing in continuous bead of sealant.
- D. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- E. Secure louver frames in openings with concealed fasteners. Coordinate with installation of aluminum door frames.
- F. Coordinate with installation of mechanical ductwork.

3.03 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

LOUVERS
08 9100-4

SECTION 09 0561 - COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section applies to floors identified in contract documents that are receiving the following types of floor coverings:
 - 1. Resilient tile and sheet.
 - 2. Carpet tile.
 - 3. Other adhesive applied floor finishes.
- B. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for moisture and alkalinity (pH).
- D. Remedial floor coatings for concrete floor slabs.

1.02 RELATED REQUIREMENTS

- A. Section 01 2200 - Unit Prices: Bid pricing for remediation treatments if required.
- B. Section 01 2300 - Alternates: Bid pricing for remediation treatments if required.
- C. Section 03 3000 - Cast-in-Place Concrete: Limitations on curing requirements for new concrete floor slabs.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Remedial Floor Coatings.
 - 1. Contractor shall perform all required remediation of concrete floor slabs;
 - a. Where remedial floor coating was indicated, Contractor shall perform the work at no additional cost to Owner
 - b. Where a moisture vapor reduction admixture (MVRA) was not required and at floor slabs where remedial floor coatings were not indicated, a contract modification will be issued based upon the following:
 - 1) No unit pricing or allowances were provided; Contractor shall record and submit written records of costs, including material quantities used, number of labor hours used, and total area, in square feet, of remediated concrete.
- B. Alternates : See Section 01 2300 - Alternates.
- C. Unit Prices: See Section 01 2200 - Unit Prices.

1.04 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2017.
- B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2017.
- D. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.06 SUBMITTALS

- A. Testing Reports:
 - 1. Description of areas tested; include floor plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and alkalinity (pH) test reports.
 - 4. Copies of specified test methods.
 - 5. Submit reports to Architect.

6. Submit reports not more than two business days after conclusion of testing.
- B. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
 1. Manufacturer's statement of compatibility with types of flooring, including adhesives, applied over remedial product.
 2. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.

1.07 QUALITY ASSURANCE

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
 1. At Contractor's option, tests may be performed by the Contractor.
- B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
- C. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and at least 5 years' experience installing moisture emission coatings.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

1.09 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Remedial Floor Coating: Single- or multi-layer coating intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
 1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
 2. Provide resistance to up to 95 percent relative humidity and 15 pounds moisture vapor transmission.
 3. Provide resistant to alkalinity (pH) level of pH 14.
 4. Products:
 - a. Koster American Corporation; VAP 2000 Zero Voc: www.kosterusa.com.
 - b. Maxxon Corporation; Aquafin Vaportight Coat-SG4: www.maxxon.com.
 - c. Schonox, HPS North America, Inc.; SDG Plus: www.hpsubfloors.com.
 - d. Specialty Products Group; Vapor Lock 0/0: www.spggogreen.com.
 - e. Tnemec Company, Inc; Epoxoprime MVT Series 208 : www.tnemec.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.02 MOISTURE VAPOR EMISSION TESTING

- A. Moisture vapor emission testing for concrete floor slabs.
 - 1. Test where adhesive applied floor finishes are to be installed, and where indicated.
 - a. Including:
 - 1) Wood platform flooring.
 - 2) Epoxy flooring.
 - 3) Resilient tile and/or sheet flooring
 - 4) Carpet tile flooring
- B. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- C. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- D. Test in accordance with ASTM F1869 and as follows.
- E. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- F. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
 - 1. After remedial floor coating has been applied, perform the test again.
 - a. If test values exceed floor covering manufacturer's limits, notify Architect immediately and await further instructions. Do not install finish flooring until authorized.
- G. Report: Report the information required by the test method.

3.03 INTERNAL RELATIVE HUMIDITY TESTING

- A. Internal relative humidity testing for concrete floor slabs.
 - 1. Test where adhesive applied floor finishes are to be installed, and where indicated.
 - a. Including:
 - 1) Wood platform flooring.
- B. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- C. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- D. Test in accordance with ASTM F2170 Procedure A and as follows.
- E. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- F. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
 - 1. After remedial floor coating has been applied, perform the test again.
 - a. If test values exceed floor covering manufacturer's limits, notify Architect immediately and await further instructions. Do not install finish flooring.
- G. Report: Report the information required by the test method.

3.04 **ALKALINITY TESTING**

- A. Alkalinity testing for concrete floor slabs.
 - 1. Test where adhesive applied floor finishes are to be installed, and where indicated.
- B. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- C. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
 - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
 - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
 - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- D. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.
 - 1. After remedial floor coating has been applied, perform the test again.
 - a. If test values exceed floor covering manufacturer's limits, notify Architect immediately and await further instructions. Do not install finish flooring until authorized.
- E. Report: Report test results.

3.05 **APPLICATION OF REMEDIAL FLOOR COATING**

- A. Apply remedial floor coating to concrete floor slabs as indicated on Drawings.
- B. Apply remedial floor coating to concrete slabs that fail one or more of the following tests:
 - 1. Moisture vapor emission testing .
 - 2. Internal relative humidity testing.
 - 3. Alkalinity testing.
- C. Install in accordance with remedial floor coating manufacturer's instructions and as follows:
 - 1. Shot blast or mechanically abrade concrete surfaces to meet surface profile of 3 to 4 per ICRI 310.2R; acid etching is not permitted.
 - 2. Vacuum and clean slab to remove all dust, dirt, and debris.
 - 3. Apply one to two coats of remedial floor coating as recommended by remedial floor coating manufacturer.

3.06 **PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal non-load-bearing interior partition, ceiling, and soffit framing.
- B. Shaft wall framing.
- C. Suspension systems for interior ceilings and soffits.
- D. Framing accessories.

1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Structural load bearing metal stud framing and Exterior wall stud framing.
- B. Section 05 5000 - Metal Fabrications: Metal fabrications attached to stud framing.
- C. Section 06 1000 - Rough Carpentry: Wood blocking within stud framing.
- D. Section 06 1000 - Rough Carpentry: Wall sheathing.
- E. Section 07 2100 - Thermal Insulation: Acoustic insulation.
- F. Section 07 8400 - Firestopping: Sealing top-of-wall assemblies at fire rated walls.
- G. Section 08 3100 - Access Doors and Panels.
- H. Section 09 2900 - Gypsum Board.

1.03 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members 2012.
- B. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2019a.
- D. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2018.
- G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2019b.
- H. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members 2018, with Editorial Revision.
- I. ASTM D3575 - Standard Test Methods for Flexible Cellular Materials Made From Olefin Polymers.
- J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2019.
- K. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- L. ASTM E413 - Classification for Rating Sound Insulation 2016.
- M. ASTM F1941/F1941M - Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric 2016.
- N. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs 2017.
- O. ASTM F594 - Standard Specification for Stainless Steel Nuts 2009 (Reapproved 2020).
- P. GA-216 - Application and Finishing of Gypsum Panel Products 2016.
- Q. GA-600 - Fire Resistance Design Manual 2015.
- R. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.

- S. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.
- T. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 **SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
 - 2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
- C. Coordination Drawings: Layout drawings indicating proposed locations of all control joints in metal-framed gypsum board partitions, walls, ceilings, bulkheads, fasciae, and soffits. Coordination drawings for this purpose may be annotated copies of Construction Documents architectural floor plans, reflected ceiling plans, and interior elevations. Submit prior to commencement of framing installation.
- D. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
- E. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.05 **QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

- A. Metal Framing, Shaft Wall Framing, Connectors, and Accessories:
 - 1. ClarkDietrich Building Systems: www.clarkdietrich.com.
 - 2. Jaimes Industries Inc.: www.jaimesind.com.
 - 3. MarinoWARE: www.marinoware.com.
 - 4. MBA Building Supplies, Inc.: www.mbastuds.com.
 - 5. State Building Products; www.statebp.com.
 - 6. The Steel Network, Inc: www.SteelNetwork.com.
 - 7. Steel Stud Solutions, LLC; www.steelstudsolutions.com.
 - 8. Telling Industries; www.buildstrong.com.
 - 9. Substitutions: See Section 01 6000 - Product Requirements.

2.02 **PERFORMANCE REQUIREMENTS**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Fire-Rated Assemblies: 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 E119 and as follows:
 - 1. Provide construction equivalent to one of the following:
 - a. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).
 - b. Gypsum Association File Numbers: Provide construction complying with requirements of GA-600 for the particular assembly.

- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- D. Shaft Walls: Provide completed assemblies with the following characteristics:
 - 1. Comply with requirements of Fire-Rated Assemblies.
 - 2. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
 - a. Air Pressure Within Shaft: Sustained loads of 7.5 lbf/sq ft with maximum mid-span deflection of L/240; unless otherwise indicated.
 - b. Acoustic Attenuation: STC of 40-44 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90; unless otherwise indicated.
- E. Horizontal Deflection: For wall assemblies, limit maximum deflection of wall framing to L/240 at 5 psf .
 - 1. Exception: Limit deflection of walls to receive hard tile surfaces to L/360 at 5 psf.
- F. Protective Coatings: Equivalent (EQ) coatings are not acceptable; products shall be hot-dip galvanized as indicated.
- G. Embossed (equivalent thickness) steel framing products are not acceptable; products shall be in steel thicknesses indicated.

2.03 FRAMING MATERIALS

- A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated.
 - 1. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized.
 - 2. Minimum Metal Thickness: 0.0329 inch (20 gage).
 - 3. Framing Depths: As indicated.
 - 4. Profiles:
 - a. Studs: C shaped with flat or formed webs.
 - b. Runners: U shaped, sized to match studs.
 - 1) Where indicated or required, provide slip-type head joints using slotted deflection track.
 - c. Ceiling Channels: C shaped.
 - d. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
- B. Slotted Deflection Track: Provide galvanized sheet steel track with slotted holes in flanges for mechanical anchorage of studs that accommodate deflection; provide screws and anti-friction bushings. Slotted connections prevent stud rotation without use of lateral bracing and maintains structural performance of partition.
 - 1. Provide at partition heads to structure connections.
 - 2. Shall prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above
 - 3. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 - 4. Comply with ASTM C645 and ASTM C754.
 - 5. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized.
 - 6. Minimum Metal Thickness: Same material thickness as studs.
 - 7. Track Depth: Matching studs.
 - 8. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.
 - a. At Contractor's option, provide the following:
 - 1) Slotted Deflection and Firestop Track: Similar to standard slotted deflection track specified, but includes intumescent strip factory-applied to track flanges or web that expands when exposed to heat or flames to provide a perimeter joint seal.
 - (a) Products:

- (1) ClarkDietrich Building Systems; BlazeFrame Firestop Deflection Track: www.clarkdietrich.com.
 - (2) MarinoWARE; FAS Track 1000: www.marinoware.com.
 - (3) Substitutions: See Section 01 6000 - Product Requirements.
- C. Preformed Top Track Firestop Seal: Pre-formed firestop device field-applied to head of top track that expands when exposed to heat or flames to provide a perimeter joint seal.
1. At Contractor's option provide preformed top track firestop seals instead of traditional perimeter joint seals.
 2. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.
 3. Products:
 - a. Hilti, Inc; Top Track Seal CFS TTS: www.us.hilti.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Resilient Furring Channels: Galvanized sheet steel, single leg, asymmetrical channel, 1/2 inch deep with a 1-1/4 inch screw flange; complying with ASTM C645.
1. Exception: At ceilings provide double leg, symmetrical channels.
 2. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized.
 3. Minimum Metal Thickness: 0.0179 inch (25 gage).
- E. Z-shaped Furring: Galvanized sheet steel z-shaped furring, 2 inches deep, unless otherwise indicated; complying with ASTM C645.
1. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized.
 2. Minimum Metal Thickness: 0.0312 inch (20 gage).

2.04 FRAMING ACCESSORIES

- A. Bridging and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.
- B. Channel Bridging and Bracing: Steel, 0.0538-inch (1.37mm) minimum base-metal thickness, with minimum 1/2-inch (13mm) wide flanges.
1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Systems Spazzer 9200 Bridging and Spacing Bar, or equivalent.
- C. Backing Plates: 0.064 inch thick (16 gage), galvanized.
- D. Wood Blocking: Refer to Section 06 1000 - Rough Carpentry.
- E. Anchorage Devices: Powder actuated or Drilled expansion bolts.
- F. Knee Wall Bracing: Reinforcing designed to support out-of-plane loading of cantilevered partial wall systems unsupported at the top track.
1. Provide in proper quantities and sizes to fully brace and reinforce wall systems unsupported at the top track; provide all related hardware and accessories.
 2. Products:
 - a. ClarkDietrich Building Systems; Pony Wall PW Series: www.clarkdietrich.com.
 - b. Pittcon Industries; SKB Knee Brace Kit: www.pittconindustries.com.
 - c. Simpson Strong-Tie; RCKW Kneewall Connectors/RCKWS Stiffeners: www.strongtie.com.
 - d. The Steel Network, Inc; Midwall: www.SteelNetwork.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements
- G. Acoustic Sealant: As specified in Section 09 2900 - Gypsum Board.
- H. Isolation Strip: Foam gasket, ASTM D3575, closed-cell vinyl foam strips, 1/8 inch thick, in width to suit steel stud size.
1. Manufacturer:
 - a. Williams; Everlastic EVA 200; www.williamsproducts.net.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.05 SHAFT WALL FRAMING MATERIALS

- A. Non-Load-Bearing Steel Framing: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated and complying with requirements for fire-resistance-rated assembly indicated.
 - 1. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized.
 - 2. Minimum Metal Thickness: 0.0329 inch (20 gage).
 - 3. Profiles:
 - a. Studs: Manufacturer's standard C-H or C-T profile.
 - 1) Depth: As indicated.
 - b. Runners: Manufacturer's standard J-profile track; matching studs in depth.
 - c. Slotted Deflection Track: As specified in "Framing Materials" above.
 - 4. Fasteners and Associated Materials: As specified in "Framing Accessories" above.

2.06 SUSPENSION SYSTEMS

- A. Carrying Channels: ASTM C955; cold-rolled galvanized steel sheet U-channel.
 - 1. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized.
 - 2. Minimum Metal Thickness: 0.064 inch (16 gage).
 - 3. Depth: 2 inches unless otherwise indicated.
- B. Furring Channels:
 - 1. Hat-Shaped, Rigid Furring Channels: As specified in "Framing Materials" above.
 - 2. Resilient Furring Channels: As specified in "Framing Materials" above.
- C. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch (16 gage) diameter or double strand of 0.048-inch (18 gage) diameter wire.
- D. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch (8 gage) diameter.
- E. Hanger Attachments to Concrete:
 - 1. Expansion Anchors: Fastener systems with evaluations based on ICC-ES AC193.
 - 2. Adhesive Anchors: Fastener systems with evaluations based on ICC-ES AC308.
 - 3. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 4. Material for Exterior Locations and Interior Wet/Humid Locations: Alloy Group 1 (A1) stainless-steel bolts, ASTM F593, and nuts, ASTM F594.
- F. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
 - 1. At Contractor's option provide grid suspension system instead of traditional carrying and furring channels.
 - 2. Not permitted for multi-layer gypsum board systems.
 - 3. Manufacturers:
 - a. Armstrong World Industries, Inc.; Drywall Grid Suspension System: www.armstrongceilings.com.
 - b. CertainTeed/Saint-Gobain; Quicksan Locking Drywall Grid System: www.certainteed.com.
 - c. Rockfon, Part of the Rockwool Group; Chicago Metallic Drywall Grid: www.rockfon.com.
 - d. USG Corporation: Drywall Suspension System: www.usg.com
 - e. Substitutions: See Section 01 6000 - Product Requirements

2.07 FABRICATION

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.

3.02 PREPARATION

- A. Control Joint Layout: Prior to commencement of framing installation submit coordination drawings indicating proposed control locations in metal-framed gypsum board partitions, walls, ceilings, bulkheads, fasciae, and soffits, for review and acceptance of Architect.
- B. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (600 mm) o.c.
 - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of metal framing and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.03 INSTALLATION OF STUD FRAMING

- A. Comply with requirements of ASTM C754.
- B. Install framing, shaft wall framing, suspension systems, and related accessories and components in accordance with manufacturer's instructions.
- C. Extend partition framing to structure where indicated and to 4 inches above ceiling in other locations unless otherwise indicated.
- D. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling framing in accordance with details.
- E. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs as indicated.
- F. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- G. Align and secure top and bottom runners at 24 inches on center.
- H. Fire-Resistance-Rated Partitions: Install framing, including shaft wall framing, to comply with fire-resistance-rated assembly indicated.
- I. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 - 1. At partitions indicated with an acoustic rating:
 - a. Provide components and install as required to produce STC ratings indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
 - b. Place two beads of acoustic sealant between runners and substrate, studs and adjacent construction.
- J. Curved Partitions:
 - 1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - 2. Begin and end each arc with a stud, and space intermediate studs equally along arcs.
- K. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- L. Install studs vertically at 16 inches on center, unless otherwise indicated.
 - 1. Install studs so flanges within framing system point in same direction
- M. Align stud web openings horizontally.
- N. Secure studs to tracks using fastener method. Do not weld.
- O. Stud splicing is not permissible.
- P. Fabricate corners using a minimum of three studs.

- Q. Double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- R. Brace stud framing system rigid.
- S. Install channel bridging and bracing (horizontal stiffeners) in stud system, spaced (vertical distance) not more than 4'-6" o.c. Install bridging and bracing members in accordance with manufacturer's instructions using recommended fasteners.
- T. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- U. Blocking/Backing: Use metal backing plate, wood blocking, or supplementary framing secured to studs. Provide blocking/backing for support of equipment services, plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and similar construction.
- V. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches.
- W. Do not bridge building control and expansion joints. Frame both sides of control joints independently.
- X. General requirements and locations of control joints in metal-framed gypsum board-sheathed construction:
 - 1. General: Comply with ASTM C840, and as noted below.
 - 2. Control joints will be installed where a partition, wall, or ceiling traverses a construction joint (expansion, or building movement control element) in the base building structure.
 - 3. Control joints will be installed where a wall or partition extends in an uninterrupted plane exceeding 30 linear feet. Door and/or window frames that extend full height of partitions will be considered equivalent to control joint construction.
 - 4. Control joints in interior ceilings, bulkheads, fasciae, and soffits will be installed so that linear dimensions between control joints do not exceed 30 linear feet and total area between control joints does not exceed 900 square feet. Control joints will be installed to isolate wings of "L", "U", and "T" shaped ceiling and soffit areas.
 - 5. A control joint will be installed where ceiling, bulkhead, fasciae, and soffit framing members change direction.
- Y. Where studs are installed directly against exterior masonry walls, install isolation strip between studs and exterior wall.

3.04 CEILING AND SOFFIT FRAMING

- A. Comply with requirements of ASTM C754.
- B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- C. Install furring independent of walls, columns, and above-ceiling work.
- D. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated.
 - 1. Space hangers at maximum 48 inches on center.
 - 2. Do not attach hangers to the following:
 - a. Metal deck or rolled-in hanger tabs of composite metal deck.
 - b. Permanent metal forms.
 - c. Ducts, pipes, or conduit.
 - 3. 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.
 - 4. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

5. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support 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 requirements.
- E. Space main carrying channels at maximum 48 inch on center, and not more than 6 inches from wall surfaces. Lap splices securely.
- F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- G. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
 1. Space furring channels at maximum 24 inches on center.
- H. Laterally brace suspension system.
- I. Grid Suspension Systems:
 1. Attach perimeter wall angle where grid suspension systems meet vertical surfaces.
 2. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- J. Refer to general Requirements for locations of control joints as specified for stud framing installation.

3.05 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.
- C. Maximum variation From Level: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 2713 - GLASS-FIBER-REINFORCED PLASTER FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass-fiber-reinforced gypsum fabrications for interiors, including:
 - 1. Column covers.
 - 2. Other items as indicated on Drawings.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Supplementary supports for large items.
- B. Section 09 2900 - Gypsum Board
- C. Section 09 9100 - Painting: Field painting and sealing prior to painting.

1.03 ABBREVIATIONS

- A. GFRG: Glass-fiber-reinforced gypsum.

1.04 REFERENCE STANDARDS

- A. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2019b.
- B. ASTM C1355/C1355M - Standard Specification for Glass Fiber Reinforced Gypsum Composites 1996 (Reapproved 2015).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For manufacturer's standard items, submit data sheets on each product to be used, including dimensions, finishes, storage and handling requirements and recommendations, and installation recommendations.
- C. Shop Drawings: For each item, provide drawings showing dimensions, layout, joints, details, fastening, and interface with adjacent work; include field measured dimensions of the spaces where items are to be installed, if critical to proper installation.
- D. Samples: Submit three samples 12 inch by 12 inch in size illustrating each surface color, finish and texture.
- E. Fabricator qualifications.
- F. Installer qualifications.

1.07 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of documented experience.

1.08 MOCK-UP

- A. Construct one column mockup with surface finish applied, including supporting backup structure.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.09 PROJECT CONDITIONS

- A. Coordinate the Work with installation of backup supporting structure and adjacent materials.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Transport, lift, and handle units with care, avoiding excessive stress and preventing damage; use appropriate equipment.
- B. Store products in manufacturer's unopened packaging until ready for installation, in a clean dry area protected from weather, moisture and damage; store units upright and not stacked unless permitted by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers:
 - 1. Casting Designs, Inc.: www.castingdesignsinc.com.
 - 2. Formglas Products Ltd.: www.formglas.com.
 - 3. GRG Technologies, LLC: www.grgtechnologies.com.
 - 4. IntexForms, Inc.: www.intexforms.com.
 - 5. Plasterform Architectural Castings, part of Armstrong: www.plasterform.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 GYPSUM FABRICATIONS

- A. Glass-Fiber-Reinforced Gypsum Fabrications: Molded glass fiber reinforced gypsum with structural reinforcing as required.
 - 1. Unit shapes, configurations and profiles as indicated on Drawings
 - 2. Surface Burning Characteristics: Flame spread index of 0 (zero), smoke developed index of 10, maximum, when tested in accordance with ASTM E84.
 - 3. Surface Finish: Suitable for paint finish, without pinholes, voids, or roughness..
 - 4. Material Characteristics: Glass-fiber-reinforced gypsum composites complying with ASTM C1355/C1355M.
 - 5. Glass Content: Minimum 5 percent by weight.
 - 6. Embedments: Provide manufacturer's typical embedments and reinforcement of galvanized steel or wood as required for unit attachment to supporting structure or suspended installations.
 - 7. Allow for adjustment of connections to accommodate misalignment of structure without permanent distortion.
 - 8. Method of Construction: Hand or spray lay-up process in molds.
 - 9. Shell Thickness: 1/4 inch, minimum.
 - 10. Shell Thickness at Part Edges and at Fastening Points: 1/2 inch, minimum.
 - 11. Outside Corner Radius: 1/8 inch, maximum.
 - 12. Draft Angle: 3 degrees, minimum, on returns, setbacks, reveals, and grooves.
 - 13. Dimensional Tolerances of Molded Surfaces:
 - a. Straightness: Maximum of 1/8 inch in 8 linear feet variation from straight at any point along any plane, edge, or surface.
 - b. Overall Width and Length: Plus/minus 1/8 inch.
 - c. Dimensions Within Overall Width and Length: Plus/minus 1/16 inch.
- B. Joint Materials: Comply with Section 09 2900 - Gypsum Board; provide the following:
 - 1. Fiberglass Tape: 2 inch, coated glass fiber tape for joints.
 - 2. Joint Compound: Setting type, vinyl-based, field-mixed.
- C. Fasteners: Of type and size to suit application; to rigidly secure units in place. Non-corrosive.
 - 1. Screws: Comply with Section 09 2900 - Gypsum Board.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that building structure and substrates are ready to receive work of this section.
- B. Do not begin installation until substrates have been properly constructed; verify that substrates are plumb and true.

- C. Check field dimensions before beginning installation. If dimensions vary too much from design dimensions for proper installation, notify Architect and wait for instructions before beginning installation.

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. Install supplementary temporary and permanent supports as required for proper installation.

3.03 INSTALLATION

- A. Install in accordance with applicable code and manufacturer's recommendations, plumb and true to line; shim where necessary.
- B. Coordinate work with installation of substrates.
- C. Site cutting of units not permitted.
- D. Fasten units in place with mechanical connections.
- E. Joint Treatment: Comply with ASTM C840.
 - 1. Use 2 inch fiberglass joint tape, embed and finish with setting type joint compound.
 - 2. Feather coats of joint compound so that camber is maximum 1/32 inch.
- F. Using joint compound fill and sand surface to remove pinholes and slight imperfections to achieve a Level 4 Finish per ASTM C840.
- G. Where units are indicated to receive semi-gloss or gloss paint finish, finish joints and surfaces as required for Level 5 in ASTM C840 , and as follows.
 - 1. Level 5 Finishing: Comply with Section 09 2900 - Gypsum Board.

3.04 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

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

GLASS-FIBER-REINFORCED PLASTER
FABRICATIONS
09 2713-4

SECTION 09 2900 - GYPSUM BOARD

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Gypsum wallboard.
- B. Shaft wall liner panels.
- C. Tile backing board.
- D. Finishing materials.
- E. Trim accessories.
- F. Acoustic insulation.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 06 1000 - Rough Carpentry: Building framing and sheathing.
- C. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- D. Section 07 2100 - Thermal Insulation: Thermal insulation.
- E. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire rated walls.
- F. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 1999 (Reaffirmed 2016).
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- F. ASTM C834 - Standard Specification for Latex Sealants 2017.
- G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2019b.
- H. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2018.
- I. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2018.
- J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2018.
- K. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base 2019.
- L. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.
- M. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2019.
- N. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- O. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels 2019.
- P. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.

- Q. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- R. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- S. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2019.
- T. ASTM E413 - Classification for Rating Sound Insulation 2016.
- U. GA-216 - Application and Finishing of Gypsum Panel Products 2016.
- V. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association 2016.
- W. GA-600 - Fire Resistance Design Manual 2015.
- X. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 **SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
 - 1. Include locations of control joints. Coordination drawings for proposed control joint locations may be annotated copies of Construction Documents architectural floor plans, reflected ceiling plans, and interior elevations. Submit prior to commencement of framing installation. Coordinate with requirements specified in Section 09 2216.
- C. Product Data: Provide data on gypsum wallboard, shaft wall liner panels, tile backing panels, finishing materials, trim accessories, acoustical accessories, and fasteners and adhesives.
- D. Samples:
 - 1. Submit three samples of each board type, 4 inches square in size.
 - 2. Submit three samples of each type of special trim, 4 inches in length.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

1.05 **QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.

1.06 **FIELD CONDITIONS**

- A. Ambient Condition (Environmental Limitations): Comply with ASTM C840 and GA-216 requirements or gypsum board manufacturer's written instructions, whichever are more stringent

PART 2 PRODUCTS

2.01 **PERFORMANCE REQUIREMENTS**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Fire-Rated Assemblies: For fire-resistance-rated assemblies that incorporate gypsum board, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 and as follows:
 - 1. Provide construction equivalent to one of the following:
 - a. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).
 - b. Gypsum Association File Numbers: Provide construction complying with requirements of GA-600 for the particular assembly.
- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- D. Shaft Walls: Provide completed assemblies with the following characteristics:

1. Comply with requirements of Fire-Rated Assemblies.
2. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
 - a. Air Pressure Within Shaft: Sustained loads of 7.5 lbf/sq ft with maximum mid-span deflection of L/240; unless otherwise indicated.
 - b. Acoustic Attenuation: STC of 40-44 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90; unless otherwise indicated.
- E. Horizontal Deflection: For wall assemblies, limit maximum deflection of wall framing to L/240 at 5 psf .
 1. Exception: Limit deflection of walls to receive hard tile surfaces to L/360 at 5 psf.

2.02 GYPSUM WALLBOARD

- A. Gypsum Wallboard: Paper-faced gypsum panels; ASTM C1396/C1396M.
 1. Thickness: 1/4, 1/2, and 5/8 inch.
 2. Long Edges: Tapered with paper face wrapping edge.
 3. Short Edges: Square cut.
 4. Sized to minimize joints.
 5. Products:
 - a. CertainTeed Corp.; Regular Gypsum Board: www.certainteed.com.
 - b. Continental Building Products; Regular Drywall: www.continental-bp.com.
 - c. Georgia-Pacific Gypsum; ToughRock Gypsum Board: www.gp.com.
 - d. National Gypsum Company; Gold Bond Brand Gypsum Board: www.nationalgypsum.com.
 - e. USG Corporation; Sheetrock Brand Gypsum Panels: www.usg.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Gypsum Wallboard - Type X: Paper-faced gypsum panels with fire-resistant core; ASTM C1396/C1396M.
 1. Thickness: 5/8 inch.
 2. Long Edges: Tapered with paper face wrapping edge.
 3. Short Edges: Square cut.
 4. Sized to minimize joints.
 5. Type: Fire resistance rated Type X, UL or WH listed.
 6. Products:
 - a. CertainTeed Corp.; Type X Gypsum Board: www.certainteed.com.
 - b. Continental Building Products; Firecheck Type X: www.continental-bp.com.
 - c. Georgia-Pacific Gypsum; ToughRock Fireguard X: www.gp.com.
 - d. National Gypsum Company; Gold Bond Brand Fire-Shield Gypsum Board: www.nationalgypsum.com.
 - e. USG Corporation; Sheetrock Brand Firecode X Panels: www.usg.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- C. Abuse Resistant Gypsum Wallboard: Heavy paper-faced, mold and moisture resistant, gypsum panel with fire-resistant core; ASTM C1396/C1396M.
 1. Thickness: 5/8 inch.
 2. Long Edges: Tapered with paper face wrapping edge.
 3. Short Edges: Square cut.
 4. Sized to minimize joints.
 5. Type: Fire resistance rated Type X, UL or WH listed.
 6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 7. Surface Abrasion: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
 8. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
 9. Soft Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.

10. Hard Body Impact: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
11. Products:
 - a. CertainTeed Corp.; Extreme Abuse Resistant Gypsum Board: www.certainteed.com.
 - b. Continental Building Products; Protecta AR 100 Type X with Mold Defense: www.continental-bp.com.
 - c. National Gypsum Company; Gold Bond Brand Hi-Abuse XP Gypsum Board: www.nationalgypsum.com.
 - d. USG Corporation; Sheetrock Brand Mold Tough AR Firecode X Panels: www.usg.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SHAFT WALL LINER PANELS

- A. Gypsum Shaft Wall Liner Panels: Moisture resistant paper-faced gypsum liner panels with fire-resistant core; ASTM C1396/C1396M
 1. Thickness: 1 inch.
 2. Width: 24 inches.
 3. Long Edges: Double beveled with paper face wrapping edge.
 4. Short Edges: Square cut.
 5. Sized to minimize joints.
 6. Type: Fire resistance rated Type X, UL or WH listed.
 7. Products:
 - a. CertainTeed Corp.; M2Tech Shaftliner Type X: www.certainteed.com.
 - b. Continental Building Products; Shaftliner Type X: www.continental-bp.com.
 - c. Georgia-Pacific Gypsum; ToughRock Shaftliner: www.gp.com.
 - d. National Gypsum Company; Gold Bond Brand Fire-Shield Shaftliner: www.nationalgypsum.com.
 - e. USG Corporation; Sheetrock Brand Gypsum Liner Panels: www.usg.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.

2.04 TILE BACKING BOARDS

- A. Cementitious Backer Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 1. Thickness: 5/8 inch.
 2. Flame Spread/Smoke Developed: 0/0 per ASTM E84.
 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 4. Locations: Wet areas and elsewhere as indicated on Drawings; including, but not limited to, the following:
 - a. Showers.
 - b. Swimming pool areas.
 5. Products:
 - a. National Gypsum Company; PermaBase Brand Cement Board: www.nationalgypsum.com.
 - b. USG Corporation; Durock Brand Cement Board: www.usg.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
 1. Thickness: 5/8 inch.
 2. Type: Fire resistance rated Type X, UL or WH listed.
 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 4. Locations: Non-wet areas and elsewhere as indicated on Drawings; including, but not limited to, the following:
 - a. Kitchens.
 - b. Laundry areas.

- c. Locker rooms.
- d. Toilet rooms.
- 5. Products:
 - a. CertainTeed Corp.; GlasRoc Diamondback Tile Backer: www.certainteed.com.
 - b. Georgia-Pacific Gypsum; DensShield Tile Backer: www.gp.com.
 - c. National Gypsum Company; Gold Bond Brand eXP Tile Backer: www.nationalgypsum.com.
 - d. USG Corporation; Durock Brand Glass-Mat Tile Backerboard: www.usg.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.05 FINISHING MATERIALS

- A. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Paper Tape: 2 inch wide, creased paper tape for joints and corners.
 - a. Exception: At tile backing board provide the following:
 - 1) Fiberglass Tape: 2 inch, coated glass fiber tape for joints and corners.
 - b. Manufacturers: Provide products from one of the specified gypsum wallboard manufacturers.
 - 2. Joint Compound: Drying and setting types, vinyl-based, ready-mixed or field-mixed.
 - a. Each coat shall be compatible with previously applied coats.
 - b. Manufacturers: Provide products from one of the specified gypsum wallboard manufacturers.

2.06 TRIM ACCESSORIES

- A. Trim Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 1. Types: As detailed or required for finished appearance. Including, but not limited to, the following:
 - a. Corner beads.
 - b. Control joints.
 - c. LC or L bead at exposed edges.
 - 2. Products:
 - a. ClarkDietrich Building Systems: www.clarkdietrich.com.
 - b. MarinoWARE: www.marinoware.com.
 - c. Telling Industries; www.buildstrong.com.
 - d. Phillips Manufacturing Co: www.phillipsmfg.com.
 - e. USG Corporation: www.usg.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Special Trims: Extruded aluminum profiles; ASTM B221 6063 T5 alloy.
 - 1. Manufacturers:
 - a. Fry Reglet Corp.; www.fryreglet.com.
 - b. Gordon, Inc.; www.gordon-inc.com.
 - c. Pittcon Industries; www.pittconindustries.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Shapes and Profiles: As indicated on Drawings, including, but not limited to, the following:
 - a. Reveals: Equal to Fry Reglet Model DCS-625-150
 - 1) Reveal Size: 1-1/2 inch wide by 5/8 inch deep
 - b. Reveals: Equal to Fry Reglet Model DRM-625-625.
 - 1) Reveal Size: 5/8 inch wide by 5/8 inch deep
 - c. F-Reveals: Equal to Fry Reglet Model DRMF-625-625.
 - 1) Reveal Size: 5/8 inch wide by 5/8 inch deep
 - d. Wall End Caps: Equal to Fry Reglet DMEC Series.
 - 1) Size to match wall construction.
 - e. Finish: Manufacturer's standard conversion coating or primed finish.
- C. Partition Closures: .
 - 1. Sound Barrier Mullion Trip Cap

- a. Products: MULL-it-OVER Products Mullion Trim Cap
- b. Substitutions: See Section 01 6000-Product Requirements.
2. Profile: 55 Classic Mullion Trim Cap
3. Aluminum Extrusion:
 - a. Thickness: 1/8 inch.
4. Sound Absorbing Foam:
 - a. Resistant to smoke, flame, and microbial growth.
 - b. Fire Rating: ASTM E84 Class 1.
 - c. Fungi Resistance: Zero rating per ASTM G21.
5. Compressible Foam: Between edge of extrusion and interior face of curtain wall glass.
 - a. Thickness: as required to accommodate mullion deflection.
 - b. Color: Light gray.
6. Fasteners:
 - a. Self Tapping or appropriate threaded fastener.
 - b. Compatible with all materials fasteners will contact with and not causing galvanic corrosion.
7. Snap Cover: Snap-on fastener cover
8. Acoustical Sound Sealant: Acrylic latex based.
9. Accessories: Provide necessary and related parts and tools to complete installation.
10. Fabrication: Extrusions and generic profiles to be shipped in custom lengths as required to meet project requirements or shipped in standard incremental foot lengths and cut to exact length on jobsite.
11. Finishes: Exposed surfaces of exposed aluminum extrusion:
 - a. Aluminum: Architect to select from manufacturer's custom color offering to match adjacent storefront finish.

2.07 ACOUSTICAL ACCESSORIES

- A. Acoustic Insulation:
 1. Mineral Fiber/Rock Wool Batts: ASTM C665; preformed mineral fiber, friction fit type, unfaced.
 - a. Thickness: 3 inches, unless otherwise indicated.
 - b. Density: 2.5 pcf.
 - c. Flame Spread/Smoke Developed: 0/0 per ASTM E84.
 - d. Products:
 - 1) JohnsManville; Mineral Wool Sound Attenuation Fire Batts (SAFB): www.jm.com.
 - 2) Owens Corning; Thermafiber SAFB (Sound Attenuation Fire Batts): www.owenscorning.com.
 - 3) Rockwool; Safe'n'Sound: www.rockwool.com.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
- B. Acoustical Sealant: Nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Reduces airborne sound transmission through perimeter joints and openings in wall assemblies.
 1. Products:
 - a. Franklin International Inc; Titebond GreenChoice Professional Acoustical Smoke & Sound Sealant: www.titebond.com.
 - b. PPG Architectural Coatings; Liquid Nails AS-825 Acoustical Sound Sealant: www.liquidnails.com.
 - c. Pecora Corporation; AC-20 FTR: www.pecora.com.
 - d. Pecora Corporation; AIS-919: www.pecora.com.
 - e. United States Gypsum Co.; USG Sheetrock Brand Firecode Smoke-Sound Sealant: www.usg.com.
 - f. United States Gypsum Co.; USG Sheetrock Brand Acoustical Sealant: www.usg.com.

g. Substitutions: See Section 01 6000 - Product Requirements.

2.08 FASTENERS AND ADHESIVES

- A. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- B. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.
- C. Screws for Fastening of Cementitious Backer Board Products to Steel Studs: Use screws of type and size recommended by panel manufacturer
- D. Anchorage to Other Substrates: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- E. Laminating Adhesive: For directly adhering gypsum-base, face-layer panels to backing-layer panels in multi-layer construction. Provide one of the following types:
 - 1. Joint Compound: As recommended by gypsum board manufacturer.
 - 2. Adhesives:
 - a. Franklin International, Inc; Titebond GREENchoice Professional Drywall Adhesive; www.titebond.com.
 - b. PPG Architectural Coatings; Liquid Nails DWP-24 Drywall Construction Adhesive: www.liquidnails.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.
- B. Control Joint Layout: Prior to commencement of framing and gypsum board installation, submit coordination drawings indicating proposed control joint locations in metal-framed gypsum board-sheathed partitions, walls, ceilings, bulkheads, fasciae, and soffits, for review and acceptance of Architect. Coordinate with requirements of Section 09 2216.

3.02 GENERAL INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

- A. General: Apply acoustic accessories at all STC-Rated Assemblies and elsewhere as indicated on Drawings.
 - 1. Apply acoustic sealant at all smoke-tight assemblies.
 - 2. Fire-Rated Construction: Install acoustic accessories in strict compliance with requirements of assembly listing.
- B. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- C. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Comply with ASTM C919.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. Seal around all penetrations by conduit, pipe, ducts, rough-in boxes, and similar items, except where firestopping is provided.

3.04 BOARD INSTALLATION

- A. Install to minimize butt end joints, especially in highly visible locations.
 - 1. Use screws for attachment of gypsum board.
 - 2. Use screws for attachment of cementitious backing board.
- B. Single-Layer Non-Rated: Install gypsum board parallel to framing, with long edges occurring over framing.
 - 1. Stagger joints on opposite sides of partitions.

- C. Multi-Layer Non-Rated: Install first layer of gypsum board parallel to framing with long edges occurring over framing. Place second layer parallel to framing with long edges occurring over framing, and joints offset from joints of first layer.
 - 1. Offset face-layer joints at least one stud or furring member from base-layer joints.
 - 2. Stagger joints on opposite sides of partitions.
 - 3. Install additional layers beyond double layers similarly; maintain offset and staggered joints between layers.
 - 4. Apply laminating adhesive between layers of gypsum board for bonding of layers in addition to fasteners.
- D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Cementitious Backing Board: Install in accordance with ANSI A108.11 and manufacturer's instructions.
- F. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.05 **INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
 - 1. Coordinate with requirements specified in Section 09 2216.
 - 2. Not more than 30 feet apart on walls and ceilings, unless otherwise indicated.
 - 3. Submit control joint locations to Architect for approval prior to installation.
 - 4. Control joints shall be constructed with manufactured control joint trim, or field fabricated from materials specified.
 - 5. Provide appropriate backing material, fire-safing insulation, and sealant for control joints installed in fire-rated and/or acoustical separations.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim (LC or L Beads): Install at locations where gypsum board abuts dissimilar materials and as indicated, using longest practical lengths.
- D. Special Trim: Install at indicated locations, and as follows.
 - 1. Wall End Caps: Provide at all exposed ends of wall assemblies not covered in wallboard and at locations of partition closures.
 - 2. Use longest practical lengths.
- E. Partition Closures: Locate at vertical junctures between end of wall assemblies and windows, glazing, and similar construction, unless otherwise indicated.
 - 1. Notch around horizontal mullions, sills, or other obstructions leaving appropriate gap for differential movement between the sound barrier wall end cap and the obstruction.
 - 2. Apply continuous bead of acoustical sealant to the unexposed side of extruded aluminum surface that will be in contact with the wall edge.
 - 3. Place sound barrier partition closure on the vertical surface of the wall partition and loosely install fasteners in the top and bottom slotted holes of the wall end cap.
 - 4. Plumb the partition closure leaving recommended gap spacing between the interior glass surface and the wall end cap. Foam gasket to be in contact with glass.
 - 5. Tighten top and bottom fasteners to secure partition closure.
 - 6. Install additional fasteners at 12 inches on center, minimum.
 - 7. Install snap cover to conceal fasteners.
 - 8. Apply color matched sealant at joints of dissimilar materials.

3.06 **JOINT TREATMENT**

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying or setting type joint compound and finish with drying type joint compound.
- B. Tile Backing Panels: Use fiberglass joint tape, embed and finish with tile setting material.
 - 1. Refer to Section 09 3000 - Hard Tiling for tile setting materials.
- C. Glass Mat Faced Gypsum Board other than Tile Backing Panels: Use fiberglass joint tape, embed and finish with setting type joint compound.

- D. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 2: In utility areas, behind cabinetry, and in similar locations that shall not be painted or finished, and at tile backing board to receive tile finish.
 - 3. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
 - a. Exception: Fire-Rated Construction shall comply with requirements of assembly listing.
- E. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 - 2. Taping, filling and sanding is not required at base layers of multi-layer applications.

3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

GYPSUM BOARD
09 2900-10

SECTION 09 3000 - HARD TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hard tile.
- B. Hard tile trim units.
- C. Tile setting materials, grout, sealants, and accessories.
- D. Metal trim.
- E. Waterproofing and crack isolation membranes.

1.02 REFERENCE STANDARDS

- A. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017.
- B. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.
- C. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement 1999 (Reaffirmed 2016).
- D. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive 2009 (Revised).
- E. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 1999 (Reaffirmed 2010).
- F. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy 1999 (Reaffirmed 2010).
- G. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout 1999 (Reaffirmed 2010).
- H. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2010).
- I. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017.
- J. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2010).
- K. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2016).
- L. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive 2013 (Revised).
- M. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2012 (Revised).
- N. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2010 (Reaffirmed 2016).
- O. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation 2014.
- P. ANSI A118.11 - American National Standard Specifications for EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2010).

- Q. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014.
- R. ANSI A137.1 - American National Standard Specifications for Ceramic Tile 2019.
- S. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2019.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples:
 - 1. Full-size units of each type of tile and each color and finish.
 - 2. Full-size units of each type of trim, threshold and accessory for each color and finish.
 - a. Trim and Threshold Samples: 4 inches long, minimum.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Tile: 2 percent of each size, color, and surface finish combination, but not less than one box of each type.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- B. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.
- C. Provide setting materials, grouts, and waterproofing and crack isolation membrane materials from one manufacturer.

1.06 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Construct mockups to demonstrate aesthetics and quality of materials and execution.
 - 1. Build mock-up of each type of floor tile and installation method.
 - 2. Build mock-up of each type of wall tile and installation method.
 - 3. Build mock-up of any other specific locations as requested by the Architect.
 - 4. Mockup sizes shall be sized as appropriate to demonstrate complete tile pattern layout; 16 square feet, minimum.
 - 5. Approved mock-ups may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.
- B. Storage: Store materials as directed by manufacturer's written instructions.

1.08 FIELD CONDITIONS

- A. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

1.09 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials that match products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Floor Tile: Floor tile shall comply with the following:
 - 1. Dynamic Coefficient of Friction (DCOF): 0.42 or greater when tested in accordance with DCOF AcuTest per ANSI A137.1.

2.02 HARD TILE

- A. CT1Porcelain Tile: ANSI A137.1 standard grade.
 - 1. Size: 23-5/8 by 23-5/8 inch (60cm x 60cm), nominal.
 - 2. Thickness: 3/8 inch (10mm), nominal.
 - 3. Surface Finish: Matte glaze.
 - 4. Color(s): Flint.
 - 5. Trim Units: Matching cove base shapes in sizes coordinated with field tile.
 - 6. Maximum Joint Size: 1/8 inch.
 - 7. Products:
 - a. Ceasar; Technolito - Matte: .
 - b. Substitutions: Not permitted.
 - c. Distributor: Virginia Tile, Kathleen Black (248) 467-4362
 - 8. Base: 5-29/32 by 23-5/8 inch (15cm x 60cm) Field Tile with Metal Edge Cap where not used with wall tile.
- B. CT2Porcelain Tile: ANSI A137.1 standard grade.
 - 1. Size: 12 by 24 inch, nominal.
 - 2. Thickness: 5/16 inch, nominal.
 - 3. Surface Finish: Unglazed Matte.
 - 4. Color(s): Gelo.
 - 5. Maximum Joint Size: 3/16 inch.
 - 6. Products:
 - a. Emser Tile; Prime: .
 - b. Substitutions: Not permitted.
 - c. Distributor: Emser Tile, Erin Leszczynski (586) 668-9046
- C. CT3Porcelain Tile: ANSI A137.1 standard grade.
 - 1. Size: 12 by 12 inch, nominal.
 - 2. Thickness: 5/16 inch, nominal.
 - 3. Surface Finish: Unglazed Matte.
 - 4. Color(s):
 - a. CT3A Menta.
 - b. CT3B Turquesa.
 - c. CT3C Lima.
 - d. CT3D Lavanda.
 - e. CT3E Ouro.
 - f. CT3F Gema.
 - 5. Maximum Joint Size: 3/16 inch.
 - 6. Products:
 - a. Emser Tile; Prime: .
 - b. Substitutions: Not permitted.
 - c. Distributor: Emser Tile, Erin Leszczynski (586) 668-9046

- D. CT4Quarry Tile: ANSI A137.1 standard grade.
1. Size: 6 by 6 inch, nominal.
 2. Thickness: 1/2 inch, nominal.
 3. Edges: Cushioned.
 4. Surface Finish: Unglazed.
 5. Color(s): Shadow Gray (N46).
 6. Trim Units: Matching bullnose base, 6 inches high, shapes and sizes coordinated with field tile.
 7. Maximum Joint Size: 3/8 inch.
 8. Products:
 - a. American Olean; Quarry Naturals: .
 - b. Substitutions: Not permitted.
 - c. Distributor: Virginia Tile, Kathleen Black (248) 467-4362
- E. CT5Ceramic Mosaic Tile: ANSI A137.1 standard grade.
1. Size: 2 by 2 inch, nominal.
 2. Thickness: 1/4 inch, nominal.
 3. Surface Finish: Unglazed.
 4. Color(s): Custom Blend
 - a. CT5A Light Smoke Speckled A04 40%.
 - b. CT5B Storm Grey Speckled A06 40%.
 - c. CT5C Bimini Blue A85 20%.
 5. Mounted Sheet Size: 12 by 24 inches.
 6. Mounting Method: Clear Face Mounted
 7. Maximum Joint Size: 1/8 inch.
 8. Base: Built-Up Cove Base MT6/MT6A as appropriate with wall tile.
 - a. Color: Light Smoke Speckled A04
 9. Products:
 - a. American Olean; Unglazed Colorbody Porcelain Mosaics:
 - b. Substitutions: Not permitted.
 - c. Distributor: Virginia Tile, Kathleen Black (248) 467-4362
- F. CT6 Ceramic Mosaic Tile: ANSI A137.1 standard grade.
1. Size: 1 by 1 inch, nominal.
 2. Thickness: 1/4 inch, nominal.
 3. Surface Finish: Unglazed.
 4. Color(s): Architect shall select two (2) colors from Manufacturer's Full Line.
 5. Mounted Sheet Size: [12 by 24] inches.
 6. Mounting Method: Clear Face Mounted
 7. Maximum Joint Size: 1/8 inch.
 8. Base: Built-Up Cove Base MT6/MT6A as appropriate with wall tile.
 - a. Color: Architect shall select one (1) color from Manufacturer's Full Line.
 9. Products:
 - a. American Olean; Unglazed Colorbody Porcelain Mosaics:
 - b. Substitutions: Not permitted.
 - c. Distributor: Virginia Tile, Kathleen Black (248) 467-4362
- G. CT7 Glazed Wall Tile: ANSI A137.1 standard grade.
1. Size: 16 by 32 inch, nominal.
 2. Thickness: 10mm, nominal.
 3. Surface Finish: Glazed Matte.
 4. Color(s): White.
 5. Maximum Joint Size: 3/32 inch.
 6. Products:
 - a. Atlas Concorde; 3D Wall; Pattern: Dune.
 - b. Substitutions: Not permitted.

- c. Distributor: Genesee Tile, Krysta Wieggers (810) 219-0040
- H. CT8 Porcelain Tile: ANSI A137.1 standard grade.
 - 1. Size: 8 by 8 inch (20cm x 20cm), nominal.
 - 2. Thickness: 10mm, nominal.
 - 3. Surface Finish: Unpolished
 - 4. Color: Onyx (A880)
 - 5. Maximum Joint Size: 1/8 inch
 - 6. Products:
 - a. Crossville; Cross-Colors Mingles; Through-Body Porcelain
 - b. Substitutions: Not permitted.
 - c. Distributor: Virginia Tile, Kathleen Black (248) 467-4362
- I. CT9 Glazed Wall Tile: ANSI A137.1 standard grade.
 - 1. Size: 4 by 4 inch (10cm x 10cm), nominal.
 - 2. Thickness: 6mm, nominal.
 - 3. Surface Finish: Glazed Wall Tile, Matte
 - 4. Color(s): .
 - a. CT9A Menta.
 - b. CT9B Turquesa.
 - c. CT9C Lima.
 - d. CT9D Lavanda.
 - e. CT9E Ouro.
 - f. CT9F Gema.
 - 5. Maximum Joint Size: 3/16 inch
 - 6. Products:
 - a. Emser Tile; Prime: .
 - b. Substitutions: Not permitted.
 - c. Distributor: Emser Tile, Erin Leszczynski (586) 668-9046

2.03 TILE TRIM UNITS

- A. Trim Units: For tile with coordinating trim units, provide bullnoses, cove bases, and other shapes as required for a complete installation.
 - 1. Shapes: As selected by Architect from manufacturer's standard shapes; coordinate with adjacent flat tile sizes and jointing.
 - 2. Sizes: As selected by Architect from manufacturer's standard sizes; coordinate with adjacent flat tile sizes and jointing.
 - 3. Manufacturers: Same as adjacent flat tile, unless otherwise indicated.

2.04 SETTING MATERIALS

- A. Latex-Portland Cement Thin-Set Mortar Bond Coat: ANSI A118.4 and ANSI A118.11
 - 1. Products:
 - a. Bostik, Inc; Bostik PM: www.bostik.com.
 - b. Custom Building Products; VersaBond Flex Professional Thin-Set Mortar : www.custombuildingproducts.com.
 - c. LATICRETE International, Inc; 253 Gold: www.laticrete.com.
 - d. MAPEI Corp.; Porcelain Tile Mortar: www.mapei.com.
 - e. TEC, H.B. Fuller Construction Products Inc.; Full Flex Premium Thin Set Mortar : www.tecspecialty.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Large Format Tile Latex-Portland Cement Medium-Bed Mortar Bond Coat: ANSI A118.4 and ANSI A118.11.
 - 1. Products:
 - a. Bostik, Inc; Big Tile & Stone: www.bostik.com.
 - b. Custom Building Products; Natural Stone & Large Tile Premium Mortar: www.custombuildingproducts.com.
 - c. LATICRETE International, Inc; 4-XLT: www.laticrete.com.

- d. MAPEI Corp.; Large Tile & Stone Mortar: www.mapei.com.
 - e. TEC, H.B. Fuller Construction Products Inc; Ultimate Large Tile Mortar or Ultraflex LFT: www.tecspecialty.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- C. Thick-Bed Mortar Bed Materials:
- 1. Pre-packaged mix of Portland cement, sand, latex additive, and water.
 - a. Products:
 - 1) Bostik, Inc; Mud-In-A-Bag with 425 Multi-Purpose Acrylic Latex Admixture: www.bostik.com.
 - 2) Custom Building Products; Thick Bed Bedding Mortar with Thin-Set & Mortar Admix: www.custombuildingproducts.com.
 - 3) LATICRETE International, Inc; 3701 Fortified Mortar: www.laticrete.com.
 - 4) MAPEI Corp.; Modified Mortar Bed: www.mapei.com.
 - 5) TEC, H.B. Fuller Construction Products Inc; Floor Mud with Acrylbond AMA Acrylic Mortar Additive: www.tecspecialty.com
 - 6) Substitutions: See Section 01 6000 - Product Requirements.

2.05 GROUTS

- A. High Performance Grout: ANSI A118.7 polymer modified cement grout or other high performance formulation.
- 1. Color(s): As selected by Architect from manufacturer's full line, unless otherwise indicated
 - 2. Products:
 - a. Bostik, Inc; Hydroment Vivid: www.bostik.com.
 - b. Custom Building Products; Prism Ultimate Performance Grout: www.custombuildingproducts.com.
 - c. LATICRETE International, Inc; PERMACOLOR Select Grout: www.laticrete.com.
 - d. MAPEI Corp.; Ultracolor Plus FA: www.mapei.com.
 - e. TEC, an H.B. Fuller Construction Products Inc; Power Grout: www.tecspecialty.com/#sle.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
- 1. Color(s): As selected by Architect from manufacturer's full line, unless otherwise indicated
 - 2. Products:
 - a. Bostik, Inc; EzPoxy EzClean: www.bostik.com.
 - b. Custom Building Products; CEG-Lite 100% Solids Commercial Epoxy Grout : www.custombuildingproducts.com.
 - c. LATICRETE International, Inc; SPECTRALOCK Pro Premium or SPECTRALOCK Premium: www.laticrete.com.
 - d. MAPEI Corp.; Kerapoxy or Kerapoxy CQ: www.mapei.com
 - e. TEC, an H.B. Fuller Construction Products Inc.; AccuColor EFX Epoxy Special Effects Grout: www.tecspecialty.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.

2.06 METAL TRIM

- A. Metal Trim: Provide metal profiles in heights to match tile and setting-bed thicknesses, designed specifically for hard tile applications.
- 1. Profiles:
 - a. SCHIENE
 - b. RENO-RAMP
 - c. RENO-U
 - d. RENO-TK
 - e. RONDEC
 - 2. Material: Brushed stainless steel.
 - 3. Applications and Locations:
 - a. Open edges of wall tile.

- b. Open edges of floor tile.
- c. Outside wall corners.
- d. Transitions between hard tile and other floor finishes.
- e. Tile perimeters not against a wall or other solid vertical surface.
4. Manufacturers:
 - a. Schluter-Systems: www.schluter.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.07 WATERPROOFING AND CRACK ISOLATION MEMBRANE

- A. Waterproofing and Crack Isolation Membrane: Elastomeric liquid applied membrane complying with ANSI A118.10 and ANSI A118.12.
 1. Applications: Use at the following locations:
 - a. All floor and traffic areas.
 - b. Shower walls and floors.
 - c. Aquatic Environments
 2. Thickness: As recommended by membrane manufacturer.
 3. Crack Resistance: No failure at 1/8 inch gap, minimum.
 4. Membrane system including fabric reinforcing.
 5. Products:
 - a. With Fabric Reinforcing:
 - 1) Bostik, Inc; GoldPlus: www.bostik.com.
 - 2) Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane: www.custombuildingproducts.com.
 - 3) LATICRETE International, Inc; Hydro Barrier: www.laticrete.com.
 - 4) MAPEI Corp.; Mapelastic AquaDefense: www.mapei.com.
 - 5) TEC, H.B. Fuller Construction Products Inc; HydraFlex: www.tecspecialty.com.
 - 6) Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
 1. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
 2. Verify that substrates comply with tolerances of TCNA (HB).
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
 1. Verify that substrates comply with tolerances of TCNA (HB).

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.

3.03 INSTALLATION - GENERAL

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Install waterproofing and crack isolation membrane according to manufacturer's instructions and TCNA (HB) recommendations.
 1. Applications: Use at the following locations:
 - a. All floor and traffic areas.
 - b. Shower walls and floors.
 - c. Aquatic Environments
- C. Bond Coats:
 1. Use latex-portland cement thin-set mortar, unless otherwise indicated.

- a. Exceptions:
 - 1) For tiles that have at least one side greater than 15 inches long, use large format tile latex-portland cement medium-bed mortar.
 - b. Bond Coat Color: White or gray.
 - D. Grout:
 - 1. Use epoxy grout at the following locations:
 - a. Toilets and bathrooms.
 - b. Showers.
 - c. Kitchen and servery areas.
 - d. Other areas as indicated.
 - 2. Use High Performance Grout.
 - E. Install tile prior to installation of equipment, cabinets, and other recessed and surface mounted items.
 - F. Completely cover substrates with tile, including those which will be under and behind surface mounted items in finished construction.
 - G. Lay tile from center lines outward unless otherwise indicated.
 - H. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
 - I. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly.
 - J. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
 - K. Form internal angles square and external angles square, with metal trim, or bullnose trim pieces as indicated.
 - L. Install accessories rigidly in place in accordance with manufacturer's instructions..
 - M. Install metal trim in accordance with manufacturer's instructions.
 - N. Sound tile after setting. Replace hollow sounding units.
 - O. Keep control and expansion joints free of mortar, grout, and adhesive.
 - P. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
 - Q. Grout tile joints unless otherwise indicated.
- 3.04 INSTALLATION - FLOORS - THIN-SET METHODS**
- A. Over concrete substrates, install in accordance with TCNA (HB) Method F122 or F122A, as appropriate to substrate conditions.
 - 1. Provide waterproofing and crack isolation membrane.
- 3.05 INSTALLATION - FLOORS - MORTAR BED METHODS**
- A. Over concrete substrates, install in accordance with TCNA (HB) Method F112.
 - 1. Provide waterproofing and crack isolation membrane.
 - 2. Mortar Bed Thickness: 3/4 inch, minimum, unless otherwise indicated.
- 3.06 INSTALLATION - WALL TILE**
- A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244C.
 - 1. Provide waterproofing and crack isolation membrane in wet areas and elsewhere as indicated.
 - B. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.
 - 1. Provide waterproofing and crack isolation membrane where indicated.
 - C. Over concrete and masonry install in accordance with TCNA (HB) Method W202I.
 - 1. Provide waterproofing and crack isolation membrane in wet areas and elsewhere as indicated.

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3.07 CLEANING

- A. Clean tile and grout surfaces.

3.08 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

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TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

HARD TILING
09 3000-10

SECTION 09 5000 - CURVED PROFILE CEILING SUSPENSION ASSEMBLIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Metal ceiling panels
 - 2. Exposed grid suspension system.
 - 3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.03 REFERENCES

- A. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- C. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016
- D. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
- E. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- G. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- H. ASTM E1477 - Standard Test Method for Luminance Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers; 1998a (Reapproved 2017).

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- B. Samples: Minimum 3 inch x 3 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.
- C. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.

1.05 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
- B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 for Class A products.
 - a. Flame Spread: 25 or less
 - b. Smoke Developed: 50 or less
- C. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle ceiling units carefully to avoid any distortion or damaged units in any way.

1.07 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
 - 1. Acoustical Panels: Sagging and warping
 - 2. Grid System: Rusting and manufacturer's defects
- B. Warranty Period:
 - 1. Acoustical panels: Thirty (30) years from date of substantial completion.
 - 2. Grid: Thirty (30) years from date of substantial completion.
 - 3. Acoustical panels and grid systems with HumiGuard Plus performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.08 MAINTENANCE

- 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. Ceiling Units: Furnish quantity of full-size units equal to 5.0 percent of amount installed.
 - 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.09 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with appropriate labels.
 - 1. Ceiling Panels: Furnish quantity of full-size units equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Ceiling Panels:
 - 1. Basis-of-Design: Armstrong World Industries, Inc.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems:
 - 1. Basis-of-Design: Armstrong World Industries, Inc.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORATED METAL SYSTEM CEILING UNITS

- A. Perforated Metal System Type PMS:
 - 1. Pattern:
 - a. H250: Perforations-1/4 inch diameter at 0.281 oc spacing, Open Area=79%, No border (meets NFPA guidelines for sprinkler systems above)
 - 2. Composition: Aluminum infill panels
 - 3. Color: Custom colors
 - 4. Size: 2 feet x 6 feet semi-concealed.

5. Noise Reduction Coefficient (NRC): NA
6. Flame Spread: Class A as per ASTM E 1264
7. Product: Serpentina 3-Dimensional Ceiling System as manufactured by Armstrong World Industries. Item Number 675 H/V 516 4STR

2.03 SUSPENSION SYSTEMS

- A. Components: Main beams fabricated from painted commercial quality extruded aluminum and cross tees, base metal and end detail, fabricated from painted commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees have a 15/16 inch type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel in baked polyester paint. No visual crimp marks or punch-outs on main beams or cross tees.
1. Color: Grid Color match the actual color of the selected ceiling tile, unless noted otherwise.
 2. Serpentina vault or hill main beams curved to 75 degree arcs, hung 24" or 48" OC; straight main beam options also available for flat ceiling applications.
 3. Butt Cut Cross Tees:
 - a. SPTB7328: 2 foot, 15/16 inch flange
 4. Corner Post SPTOSCP: Pre-assembled corner
 5. Cross Tee Connector Clip AXCCLT: Twist-in clip with pre-punched holes for attachment of cross tees to perimeter trim
 6. Semi-Concealed Components:
 - a. Inner Module Connector SCXT24MR: Connector tee between two main runners.
 - b. Outer Module Connector SCXT24SPT: Connector tee between main runner and perimeter trim.
 - c. Outer-to-Outer Module Connector SCXT24SPT2: Connector tee is connection between two pieces of perimeter trim.
 - d. Speed Clip: Used to splice two semi-concealed panels together.
 7. Strong Back: Used for aid stability and squaring of the system during installation. Also eliminates hanger wires on perimeter cross tees. Note: Hanger wires are still to be attached to the main runners, not the StrongBack
- B. Edge Moldings and Trim:
1. Extruded aluminum perimeter "J" moldings SJMS - Serpentina J Molding for shallow arcs & SJMT - Serpentina J Molding for tight arcs.
 2. For floating ceiling applications, use Serpentina Perimeter Trim SPT.
- C. Accessories: Serpentina Hold Down Clips #SPTCHDC used as necessary to hold infill panels flush with suspension system.
- D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- E. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Do not proceed with installation until all wet work such as concrete and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.02 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

- B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
 - 1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.03 INSTALLATION

- A. Install suspension system and panels in accordance with the manufacturer's installation instructions, LA 295589 and in compliance with ASTM C 636 and with the authorities having jurisdiction.
- B. Suspend main beam from overhead construction with hanger wires spaced 4'-0" on center along the length of the main runner. Install hanger wires plumb and straight.
- C. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.04 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 5100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended acoustical ceilings including:
 - 1. Metal grid suspension systems.
 - 2. Acoustical panels.
 - 3. Acoustical insulation above ceiling.
- B. Removal, salvaging, and reinstallation of existing suspended acoustical ceilings.

1.02 RELATED REQUIREMENTS

- A. Section 09 5153 - Direct-Applied Acoustical Ceilings.

1.03 REFERENCE STANDARDS

- A. ASTM B164 - Standard Specification for Nickel-Copper Alloy Rod, Bar, and Wire; 2014.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- C. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2017.
- D. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2013.
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- F. ASTM C834 - Standard Specification for Latex Sealants 2017.
- G. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces 2008 (Reapproved 2019).
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- I. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions 2020.
- J. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2019.
- K. CISCA (CSH) - Ceiling Systems Handbook.

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 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.
- C. Product Data: Provide data on suspension system components and acoustical panels.
suspension system components and acoustical panels.
- D. Samples:
 - 1. Acoustical Panels: Submit 3 samples, 6 by 6 inch in size, for each type and finish of acoustical panel.
 - 2. Metal Grid Suspension Systems: Submit 3 samples each, 12 inches long, for each type and finish of suspension system main runner, cross runner, perimeter molding, and fascia trim.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Acoustical Panels: Quantity equal to 2 percent of total installed, but not less than one box for each type and finish.

1.06 QUALITY ASSURANCE

- A. Metal Grid Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience.
- B. Acoustical Panel Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience.
- C. Installer Qualifications: Company experienced in performing acoustical ceiling installations, with minimum of 5 years of documented experience.

1.07 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Warranties: Provide the following manufacturer warranties:
 1. Acoustic Panel Warranty: Against defects in materials and workmanship.
 - a. Warranty Length:
 - 1) 30 years.
 2. Metal Grid Suspension Systems: Against defects in materials and workmanship.
 - a. Warranty Length:
 - 1) 30 years.
 3. Sag Warranty: Acoustic panels shall not show visible sag.
 - a. Warranty Length: 30 years.
 4. Mold and Mildew Warranty: Acoustic panels shall be free from mold and mildew growth.
 - a. Warranty Length: 30 years.
 5. Rust Warranty: Metal grid suspension systems shall be free from the occurrence of 50 percent red rust per ASTM D610.
 - a. Warranty Length: 30 years.

1.09 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with appropriate labels.
 1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 2.0 percent of amount installed.
 2. Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Panels: Provide either the specified product or a comparable product by one of the following:
 1. Armstrong World Industries, Inc: www.armstrongceilings.com.
 2. CertainTeed Corporation: www.certainteed.com.
 3. Rockfon North America: www.rockfon.com.
 4. USG Corporation: www.usg.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems and Fascia Trim: Provide either the specified product or a comparable product by one of the following:
 1. Armstrong World Industries, Inc: www.armstrong.com.
 2. CertainTeed Corporation: www.certainteed.com.

3. Rockfon North America/Chicago Metallic: www.rockfon.com.
 4. USG Corporation: www.usg.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- C. Source Limitations: Obtain acoustic panels, suspension systems, and fascia trims from one manufacturer unless otherwise indicated or approved in writing by Architect.

2.02 ACOUSTICAL PANELS

- A. Acoustical Panels - General: ASTM E1264, Class A.
- B. ACT1Acoustical Panels: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 7/8 inch.
 3. Composition: Wet felted.
 4. Light Reflectance: 0.86, determined in accordance with ASTM E1264.
 5. NRC: 0.70, determined in accordance with ASTM E1264.
 6. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 7. Edge: SLT.
 8. Surface Color: White.
 9. Suspension System: Exposed grid Type SG-1.
 10. Products:
 - a. USG Interiors, LLC; Eclipse ClimaPlus, No. 76775: www.usg.com.
- C. ACT2Acoustical Panels: Vinyl faced gypsum panel, ASTM E1264 Type XX, with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 1/2 inch.
 3. Composition: Gypsum.
 4. Light Reflectance: 0.77 percent, determined in accordance with ASTM E1264.
 5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 6. Edge: Square.
 7. Surface Color: White.
 8. Suspension System: Exposed grid Type SG-1.
 9. Products:
 - a. USG Interiors, LLC; Sheetrock Brand Lay-in Gypsum Ceiling Panels, Climaplus, No. 3260: www.usg.com.
- D. ACT3Acoustical Panels: Ceramic faced mineral fiber, ASTM E1264 Type XX, galvanized steel with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 5/8 inch.
 3. Composition: Ceramic-bonded Mineral Fiber.
 4. Light Reflectance: 0.82 percent, determined in accordance with ASTM E1264.
 5. NRC Range: 0.50, determined in accordance with ASTM E1264.
 6. Ceiling Attenuation Class (CAC): 40, determined in accordance with ASTM E1264.
 7. Edge: Square.
 8. Surface Color: White.
 9. Suspension System: Exposed grid Type SG2.
 10. Products:
 - a. USG Interiors, LLC; Radar Ceramic Clima Plus, Climaplus, No. 56644 : www.usg.com.
- E. ACT4Acoustical Panels: Latex painted Glass scrim surface faced stone wool (mineral wool), ASTM E1264 Type XX, with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 5/8 inch.
 3. Composition: Stone wool (mineral wool).

4. Light Reflectance: 0.86 percent, determined in accordance with ASTM E1264.
 5. NRC Range: 0.85, determined in accordance with ASTM E1264.
 6. Edge: Square Tegular (SL).
 7. Surface Color: White.
 8. Suspension System: Exposed grid Type SG3.
 9. Products:
 - a. Rockfon North America; Rockfon Tropic, No. 1060: www.rockfon.com.
- F. ACT5Acoustical Panels: Painted mineral fiber, ASTM E1264 Type XX, with the following characteristics:
1. Size: 24 by 48 inches.
 2. Thickness: 3/4 inch.
 3. Composition: Wet Felted.
 4. Light Reflectance: 0.84 percent, determined in accordance with ASTM E1264.
 5. NRC Range: 0.55, determined in accordance with ASTM E1264.
 6. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 7. Edge: Shadowline Tapered (SLT).
 8. Surface Color: White.
 9. Suspension System: Exposed grid Type SG-1.
 10. Products:
 - a. USG Interiors, LLC; Radar Illusion Ceiling Panels, Climaplus, No. 2842
: www.usg.com.
- G. ACT6Acoustical Panels: Painted mineral fiber, ASTM E1264 Type XX, with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 1 inch.
 3. Composition: Wet felted.
 4. NRC Range: 0.85, determined in accordance with ASTM E1264.
 5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 6. Edge: Square.
 7. Surface Color: Custom Color.
 8. Suspension System: Exposed grid Type SG4.
 9. Products:
 - a. Armstrong World Industries, Inc; Calla, No. 2820 Custom color
: www.armstrongceilings.com.
- H. ACT7Acoustical Panels: Painted mineral fiber, ASTM E1264 Type XX, with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 1 inch.
 3. Composition: Wet felted.
 4. NRC Range: 0.85, determined in accordance with ASTM E1264.
 5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 6. Edge: Square.
 7. Surface Color: Custom Color.
 8. Suspension System: Exposed grid Type SG5.
 9. Products:
 - a. Armstrong World Industries, Inc; Calla, No. 2820 Custom color: www.armstrongceilings.com.
- I. ACT8Acoustical Panels: Painted mineral fiber, ASTM E1264 Type XX, with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 1 inch.
 3. Composition: Wet felted.
 4. NRC Range: 0.85, determined in accordance with ASTM E1264.

5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 6. Edge: Square.
 7. Surface Color: Custom Color.
 8. Suspension System: Exposed grid Type SG6.
 9. Products:
 - a. Armstrong World Industries, Inc; Calla, No. 2820 Custom color: www.armstrongceilings.com.
- J. ACT9Acoustical Panels: Painted mineral fiber, ASTM E1264 Type XX, with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 1 inch.
 3. Composition: Wet felted.
 4. NRC Range: 0.85, determined in accordance with ASTM E1264.
 5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 6. Edge: Square.
 7. Surface Color: Custom Color.
 8. Suspension System: Exposed grid Type SG7.
 9. Products:
 - a. Armstrong World Industries, Inc; Calla, No. 2820 Custom color: www.armstrongceilings.com.
- K. ACT10Acoustical Panels: Painted mineral fiber, ASTM E1264 Type XX, with the following characteristics:
1. Size: 24 by 24 inches.
 2. Thickness: 1 inch.
 3. Composition: Wet felted.
 4. NRC Range: 0.85, determined in accordance with ASTM E1264.
 5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 6. Edge: Square.
 7. Surface Color: Custom Color.
 8. Suspension System: Exposed grid Type SG8.
 9. Products:
 - a. Armstrong World Industries, Inc; Calla, No. 2820 Custom color : www.armstrongceilings.com.

2.03 SUSPENSION SYSTEMS

- A. Metal Grid Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, and perimeter moldings as required.
- B. SG1Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
1. Profile: Tee; 15/16 inch wide face.
 2. Construction: Double web.
 3. Finish: White painted.
 4. Products:
 - a. USG Interiors, LLC; USG Donn Brand DX/DXL: www.usg.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. SG2Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty per ASTM C635.
1. Profile: Tee; 15/16 inch wide 5/16" exposed face.
 2. Construction: Double web.
 3. Finish: White.
 4. Products:
 - a. USG Interiors, LLC; Donn Brand ZXLA Suspension System: www.usg.com.

- b. Substitutions: See Section 01 6000 - Product Requirements.
- D. SG3Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty per ASTM C635.
 - 1. Profile: Tee; 15/16 inch wide 5/16" exposed face.
 - 2. Construction: Double web.
 - 3. Finish: White.
 - 4. Products:
 - a. CertainTeed Corporation; 15/16" EZ Stab Classic Environmental System : www.certainteed.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. SG-4Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
 - 1. Profile: Tee; 15/16 inch wide 5/16" exposed face.
 - 2. Construction: Double web.
 - 3. Finish: Custom Color.
 - 4. Products:
 - a. Armstrong World Industries, Inc; Prelude XL: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- F. SG-5Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
 - 1. Profile: Tee; 15/16 inch wide 5/16" exposed face.
 - 2. Construction: Double web.
 - 3. Finish: Custom Color.
 - 4. Products:
 - a. Armstrong World Industries, Inc; Prelude XL: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- G. SG-6Exposed Steel Suspension System: Formed , ASTM E1264 Type XX, galvanized steel, commercial quality cold rolled; intermediate-duty.
 - 1. Profile: Tee; 15/16 inch wide 5/16" exposed face.
 - 2. Construction: Double web.
 - 3. Finish: Custom Color.
 - 4. Products:
 - a. Armstrong World Industries, Inc; Prelude XL: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- H. SG-7Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
 - 1. Profile: Tee; 15/16 inch wide 5/16" exposed face.
 - 2. Construction: Double web.
 - 3. Finish: Custom Color.
 - 4. Products:
 - a. Armstrong World Industries, Inc; Prelude XL: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- I. SG-8Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
 - 1. Profile: Tee; 15/16 inch wide 5/16" exposed face.
 - 2. Construction: Double web.
 - 3. Finish: Custom Color.
 - 4. Products:
 - a. Armstrong World Industries, Inc; Prelude XL: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 FASCIA TRIM

- A. Fascia Trim: Metal fascia trim for free form ceiling drops and open edges of metal grid suspension systems.
 - 1. Material: Extruded aluminum; ASTM B221, in alloy and temper as recommended by trim manufacturer.
 - 2. Finish: As follows:
 - a. Color A: White.
 - b. Color B: Custom Color.
 - c. Color C: Custom Color.
 - d. Color D: Silver Satin
 - 3. Trim Height: As indicated.
 - 4. Products:
 - a. Armstrong World Industries, Inc; Axiom Classic: www.armstrongceilings.com.
 - b. USG Interiors, LLC; Compasso Elite: www.usg.com.

2.05 ACCESSORIES

- A. Provide all required accessories including perimeter moldings, splice plates, clips, and associated hardware, hangers, rivets, and fasteners.
- B. Hanger Wire, Anchors, and Related Support Materials:
 - 1. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
 - 2. Hanger Wire: 12-gage 0.08 inch galvanized steel wire.
 - 3. Size attachment devices for five times the design load indicated in ASTM C635/C635M, Table 1, Direct Hung, unless otherwise indicated.
 - 4. Size hanger wire for three times hanger design load indicated in ASTM C635/C635M, Table 1, Direct Hung, but not less than 0.106-inch diameter wire; three times the design load shall be less than yield stress of wire.
 - 5. Natatorium/Pool Environments: Provide the following:
 - a. Hanger Wire Material: Nickel-copper alloy, Monel 400; ASTM B164.
- C. Perimeter Moldings: Same metal and finish as grid.
 - 1. At Wall Perimeters: Provide L-shaped molding for mounting at same elevation as face of grid.
 - 2. Provide inside and outside prefabricated corner moldings.
 - 3. At Bullnose Corners: Provide radius corner moldings to match bullnose radius of adjacent walls.
- D. Touch-up Paint: Type and color to match acoustical and grid units.

2.06 ACOUSTICAL ACCESSORIES

- A. Acoustic Insulation: Provide one of the following types:
 - 1. Mineral Fiber/Rock Wool Batts: ASTM C665; preformed mineral fiber, friction fit type, unfaced.
 - a. Thickness: 3 inches, unless otherwise indicated.
 - b. Density: 2.5 pcf.
 - c. Flame Spread/Smoke Developed: 0/0 per ASTM E84.
 - d. Products:
 - 1) JohnsManville; Mineral Wool Sound Attenuation Fire Batts (SAFB): www.jm.com.
 - 2) Owens Corning; Thermafiber SAFB (Sound Attenuation Fire Batts): www.owenscorning.com.
 - 3) Rockwool; Safe'n'Sound: www.rockwool.com.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Fiberglass Batts: ASTM C665; preformed glass fiber, friction fit type, unfaced.
 - a. Thickness: 3-1/2 inches, unless otherwise indicated.
 - b. Products:

- 1) CertainTeed Corporation/Saint-Gobain; NoiseReducer Sound Attenuation Batts: www.certainteed.com.
 - 2) Johns Manville; Formaldehyde-Free Fiberglass Insulation: www.jm.com.
 - 3) Knauf Insulation; EcoBatt Insulation with ECOSE Technology: www.knaufinsulation.com.
 - 4) Owens Corning Corporation; EcoTouch Sound Attenuation Batts: www.owenscorning.com.
 - 5) Substitutions: See Section 01 6000 - Product Requirements.
- B. Acoustical Sealant: Nonsag, paintable, nonstaining latex sealant complying with ASTM C834; for use in conjunction with perimeter moldings of suspended ceiling systems.
1. Products:
 - a. Franklin International Inc; Titebond GreenChoice Professional Acoustical Smoke & Sound Sealant: www.titebond.com.
 - b. PPG Architectural Coatings; Liquid Nails AS-825 Acoustical Sound Sealant: www.liquidnails.com.
 - c. Pecora Corporation; AIS-919: www.pecora.com.
 - d. United States Gypsum Co.; USG Sheetrock Brand Acoustical Sealant: www.usg.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

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. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.03 REMOVAL, SALVAGING, AND REINSTALLATION OF EXISTING SUSPENDED ACOUSTICAL CEILINGS

- A. Remove, salvage and reinstall existing acoustical panels and suspension system as required to facilitate new construction.
 1. Take care not to scratch, chip, gouge, dent or otherwise damage acoustical panel faces or edges.
 2. Take care not to scratch, bend, dent, twist, rack or otherwise damage suspension grid members.
 3. Safely store removed materials and protect from damage.
- B. Modify existing grid system and acoustic panels to accommodate new work.
- C. Reinstall according to requirements of this Section for new work.
- D. Replace any damaged or missing grid with new.
 1. Match existing grid system in size, color, texture, and material.
- E. Replace any damaged or missing acoustical panels with new.
 1. Match existing acoustical panels in size, color, texture, and material.

3.04 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, CISCA (CSH), and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 1. Install moldings in bed of acoustical sealant.

2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends.
3. Use longest practical lengths.
4. Corners:
 - a. At Bullnose Corners: Provide prefabricated radius corner moldings to match bullnose radius of walls.
 - b. At Square Corners: Provide prefabricated corner moldings.
 - 1) At Other Angles Corners: Overlap perimeter moldings.
5. Do not use exposed fasteners, including pop rivets.
- E. Fascia Trim: Install fascia trim of type indicated at perimeter and transition locations indicated according to manufacturer's written instructions.
- F. Hang metal grid suspension systems independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Connect hangers directly to structure, inserts, eye screws, or other connections that are secure and appropriate for substrate. Connections shall not deteriorate or corrode.
- H. Fasten hangers to structural members, cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 1. Do not attach hangers to metal forms, steel deck tabs, or metal decking.
- I. Support metal grid suspension systems with hangers not more than 48 inches o.c. along main grid members.
 1. Support grid members directly from hangers unless otherwise indicated.
 2. Provide hangers not more than 8 inches from ends of each member.
- J. Install hangers plumb except where required to miss obstructions; brace splayed hangers as required to offset horizontal forces.
- K. Install supplemental hanger supports to bridge large ducts and other wide obstacles that interfere with required hanger spacings or when steel framing is not located appropriately for required hanger spacings.
- L. Size hangers and supplemental supports to support ceiling loads within performance limits established by referenced standards and this specification section.
- M. Secure wire hangers to metal grid suspension systems and above supports with four tight turns, minimum.
- N. Hangers shall not contact adjacent materials within the ceiling plenum.
- O. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- P. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- Q. Do not eccentrically load system or induce rotation of runners.
- R. Do not install dented, bent, or kinked metal grid suspension members.

3.05 **INSTALLATION - ACOUSTICAL PANELS**

- A. Install acoustical panels 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. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical panels level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 1. Make field cut edges of same profile as factory edges.
 2. Field paint exposed cut edges.

- G. Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions, unless otherwise indicated.
- H. Lay acoustical insulation continuously across top of acoustical panel ceiling system without gaps where indicated.

3.06 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 5416 - LUMINOUS CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Luminous infill panels.
- B. Metal suspension system.

1.02 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2017.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2013.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate layout of support locations and details for ceiling suspension, and orientation of the images or patterns on luminous panels.
- C. Product Data: Provide data showing ceiling component construction and finishes.
- D. Ceiling Support Samples: Submit two samples of exposed ceiling support members, 12 inches in length, illustrating material and finish.
- E. Luminous Element Samples: Submit two samples, 12 by 12 inches in size, illustrating material, finish, and support details.
- F. Maintenance Data: Manufacturer's instructions for cleaning and replacement.
- G. Manufacturer's Qualification Statement.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Warranty Period:
 - 1. Infusion Products: One (1) year from date of substantial completion.
 - 2. Attachment devices: One (1) year from date of substantial completion.
- C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.05 MOCK-UP

- A. Provide mock-up of each type of luminous ceiling system, including at least one of each component.
 - 1. Locate where directed.
- B. Mock-up may remain as part of the Work.

1.06 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with appropriate labels.
 - 1. Ceiling Panels: Furnish quantity of full-size units equal to 2.0 percent of amount installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Luminous Infill Panels:
 - 1. Basis-of-Design: Armstrong World Industries; INFUSIONS Accent Canopies Item 54061: www.armstrongceilings.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LUMINOUS CEILINGS

- A. Luminous Infill Panels, Type 54061:
 - 1. Material: Polycarbonate.
 - 2. Thickness: 1/4 inch, nominal.
 - 3. Color: A: Peace Blue TPB.
 - 4. Color: B: Cultured Pearl TCP.
 - 5. Panel Size: 24 by 72 inches.
- B. Metal Suspension System:
 - 1. General: Comply with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, and splices as required.
 - 2. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement.
 - 3. Hanging Kit:
 - a. Basis-of-Design: Armstrong Ceilings 7005 Extended Hanging Kit - 16'
 - 1) Provide hanging kit with all accessories for a complete installation as recommended by manufacturer.
 - 2) Kit Contents include, but are not limited to: Gripper Structure Anchor, Gripper Anchor Caps, Upper Cables, Gripper Bottom End Assemblies, Bottom End Cable Adjusters

PART 3 EXECUTION

3.01 INSTALLATION

- A. General: Install luminous ceiling in accordance with manufacturer's instructions.
- B. Suspension System:
 - 1. Install suspension system in accordance with ASTM C636/C636M and manufacturer's instructions and as supplemented in this section.
 - 2. 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.
 - 3. 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.
 - 4. Do not eccentrically load system or produce rotation of runners.
- C. Luminous Infill Panels:
 - 1. Fit panels in place, free from damaged edges or other defects detrimental to appearance and function.
 - 2. Install panels level, in uniform plane, and free from twist, warp, and dents.

3.02 CLEANING

- A. Clean luminous ceiling elements in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09 6476 - WOOD STAGE FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wood stage flooring systems.

1.02 RELATED REQUIREMENTS

- A. Section 09 0561 - Common Work Results for Flooring Preparation: Independent agency testing of concrete slabs.

1.03 REFERENCE STANDARDS

- A. PS 1 - Structural Plywood 2009.
- B. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2018.
- C. ASTM D3575 - Standard Test Methods for Flexible Cellular Materials Made From Olefin Polymers; 2014.
- D. ASTM D1622/D1622M - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2014.
- E. NWFA (IG) - Installation Guidelines; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for flooring, floor finish materials, and resilient cushion.
 - 1. Include color charts of colors and glosses available for the following:
 - a. Floor finishes.
- C. Shop Drawings: Indicate floor joint pattern and termination details.
 - 1. Indicate provisions for expansion and contraction and wall base.
 - 2. Indicate size and type fasteners and anchors.
 - 3. Show resilient pad layout and spacing.
- D. Samples: Submit 3 samples 12 by 12 inch in size illustrating floor construction, floor finish, color, and sheen.
 - 1. Include 3 samples of vented base, 6 inches long for each color selected.
- E. Maintenance Data: Include maintenance procedures and recommended maintenance materials.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with NWFA (IG).
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
 - 1. Minimum 5 years of documented experience.
- C. Installer Qualifications: Company specializing in installing products specified in this section.
 - 1. Minimum 5 years of documented experience.

1.06 MOCK-UP

- A. Construct mock-up of wood stage flooring including subflooring, resilient cushioning, and wood flooring. Illustrate final finish.
 - 1. Provide when requested by Architect.
- B. Size of mock-up to be not less than 8 feet long by 8 feet wide.
- C. See Section 01 4000 - Quality Requirements for additional requirements.
- D. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and store off the floor in a well-ventilated, weather-tight space.

1.08 FIELD CONDITIONS

- A. Do not install wood flooring until wet construction work is complete and permanent heat and air conditioning is installed and operating.
- B. Maintain room temperature between 55 degrees F and 75 degrees F and relative humidity between 35 to 50 percent for a period of seven days prior to delivery of materials to installation space, during installation, and after installation.
- C. Acclimate wood flooring materials to installation space a minimum of 48 hours prior to installation.

PART 2 PRODUCTS

2.01 WOOD STAGE FLOORING

- A. General: Acrylic-Infused Engineered Wood Flooring
- B. Application: Performance stage.

2.02 ACRYLIC-INFUSED ENGINEERED WOOD FLOORING

- A. Nydree Flooring
 - 1. Species: Maple
 - 2. Color: Natural
 - 3. Thickness: 7/16"
 - 4. Width: 4"
 - 5. Length: 12" to 47" Random
 - 6. Profile: Tounge and Groove Sides
 - 7. Edge Style: Micro-bevelled
 - 8. Finish: Pedestrian 2.0
 - 9. Installation Pattern: Random

2.03 ACCESSORIES

- A. Subfloor Filler: Trowelable leveling and patching compound; latex-modified, hydraulic-cement-based formulation.
 - 1. Products:
 - a. Ardex Engineered Cements; Ardex Feather Finish: www.ardexamerica.com.
 - b. Custom Building Products; Skim Coat & Patch Cement Underlayment; www.custombuildingproducts.com.
 - c. TEC, an H.B. Fuller Construction Products Brand; Feather Edge Skim Coat with Patch Additive: www.tecspecialty.com.
 - d. Substitutions: Section 01 6000 - Product Requirements.
- B. Vapor Retarder: Polyethylene sheet, 6 mil thick, ASTM D4397; 2 inch wide tape for sealing sheet seams.
 - 1. Products:
 - a. Fortifiber Corporation; Moistop Ultra 6: www.fortifiber.com.
 - b. Raven Industries Inc.; VaporBlock VB6: www.ravenefd.com.
 - c. Stego Industries, LLC; Stegocrawl Wrap 6-mil Vapor Retarder: www.stegoindustries.com.
 - d. Substitutions: Section 01 6000 - Product Requirements.
- C. Fasteners and Anchors: Manufacturer's standard type and size to suit application.
 - 1. Nails, Brads, and Staples: ASTM F1667.
- D. Adhesives: Construction adhesive to suit application and compatible with subflooring materials.

PART 3 EXECUTION

3.01 EXAMINATION:

- A. Verify that concrete subfloor surface is smooth and flat to plus or minus 1/8 inch in 10 feet.
- B. Cementitious Subfloor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 0561 - Common Work Results for Flooring Preparation.

3.02 PREPARATION

- A. Prepare substrate to receive wood flooring system.
 - 1. Concrete: Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- B. Vacuum clean substrate.

3.03 INSTALLATION

- A. Place vapor retarder over concrete surface, overlap seams a minimum of 6 inches and seal with tape.
 - 1. At perimeter turned vapor retarder up walls, 2 inches minimum.
- B. Layout blanket insulation with cutouts for the resilient pads and blocking.
 - 1. Insulation shall fill spaces between pads and blocking out to stage floor perimeter without gaps.
- C. Wood Flooring:
 - 1. Install in accordance with manufacturer's and NWFA instructions.
 - 2. Install wood flooring with concealed mechanical fasteners.
 - 3. Install edge strips at unprotected or exposed edges, and where flooring terminates.
 - 4. Provide 3/4 inch expansion space at walls and other interruptions.
- D. Install floor sockets, inserts, and cover plates to a depth sufficient to ensure flush top surface with floor surface.
- E. Door Thresholds: Refer to Section 08 7100 - Door Hardware.
- F. Install base at floor perimeter to cover expansion space in accordance with manufacturer's instructions. Miter inside corners.
 - 1. Install after finishing floors.

3.04 CLEANING

- A. Clean floor surfaces in accordance with floor finish manufacturer's instructions.

3.05 PROTECTION

- A. Prohibit traffic on finished floor for 72 hours after installation.
- B. Place protective coverings over finished floors; do not remove coverings until Date of Substantial Completion.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

WOOD STAGE FLOORING
09 6476-4

SECTION 09 6500 - RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient sheet flooring.

1.02 REFERENCE STANDARDS

- A. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing 2004 (Reapproved 2014).
- B. ASTM F1516 - Standard Practice or Sealing Seams of Resilient Flooring Products by Heat Weld Method (when Recommended); 2018.
- C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- D. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing 2019.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Verification Samples:
 - 1. Resilient Sheet Flooring: Submit 3 samples, 6 by 9 inch in size for each color and pattern specified.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- F. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Materials: Quantity equal to 2 percent of total installed, but not less than one box or roll for each type and color.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum 5 years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

1.06 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.07 EXTRA MATERIALS

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 - 1. Sheet Flooring: Furnish not less than 5 linear yards for each type, color and pattern installed.

PART 2 PRODUCTS

2.01 SHEET FLOORING

- A. SV2Vinyl Sheet Flooring: Homogeneous without backing, with color and pattern throughout full thickness.
 - 1. Products:
 - a. UpoFloor; Enomer Contract Sheet Flooring: Zero Sheet.
 - b. Substitutions: Not permitted.
 - 2. Minimum Requirements: Comply with ASTM F1913.
 - 3. Thickness: 0.080 inch (2.0 mm) nominal.
 - 4. Sheet Width: 57 inch minimum.
 - 5. Seams: Heat welded.
 - 6. Integral covered base with cap strip.
 - a. Height: 4 inches, unless otherwise indicated.
 - 7. Color(s):
 - a. Color A: Concrete (5712)
 - b. Color B: Aquamarine (5753)
 - c. Color C: Thorn Apple (5762)
 - d. Color D: Lavender (5757)
 - e. Color E: Carotene (5732)
 - f. Color F: Mayan Maze (5728)
 - g. Color G: Pewter (5703)
 - 8. Manufacturer's Representative: Scott Bell (248) 342.6052
- B. SV1Vinyl Sheet Flooring: Transparent or translucent vinyl wear layer over interlayer and backing.
 - 1. Products:
 - a. Gerflor; Taraflex Multi-Use 6.2: .
 - b. Substitutions: Not permitted.
 - 2. Minimum Requirements: Comply with ASTM F1303, Type I, with Class A fibrous backing.
 - 3. Printed Interlayer: Closed cell urethane foam.
 - 4. Wear Layer Thickness: 0.080 inch minimum.
 - 5. Total Thickness: 0.244 inch (6.2 mm) minimum.
 - 6. Sheet Width: 59 inch minimum.
 - 7. Seams: Heat welded.
 - 8. Integral covered base with cap strip. Location as indicated on Drawings.
 - a. Product: Taraflex Surface
 - 1) Height: 4 inches.
 - 2) Color: Anthracite (6873).
 - 9. Color(s):
 - a. Color A: Wood Grey (3708)
 - b. Color B: Wood Blue (4453)
 - 10. Manufacturer's Representative: Tony Britsky (248) 879-8779
- C. Welding Rod: Solid bead in material compatible with flooring, produced by flooring manufacturer for heat welding seams, and in color matching field color unless otherwise indicated.

2.02 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Cove Base Cap Strip: As standard with flooring manufacturer.
 - 1. Material: Vinyl.
 - 2. Profile: Manufacturer's standard profile.
- D. Cove Base Former:
 - 1. Profile: 4012
 - 2. Color: Noir
- E. Floor Moldings, Stair Coverings, and Resilient Base: Refer to Section 09 6513 - Resilient Bases and Accessories.

PART 3 EXECUTION

3.01 EXAMINATION

- A. 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.
- B. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 0561 - Common Work Results for Flooring Preparation.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.
- E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Fully adhere resilient floor finishes to substrates using a full spread of adhesive completely covering substrate.
 - 2. Spread only enough adhesive to permit installation of materials before initial set.
 - 3. Fit joints and butt seams tightly.
 - 4. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- F. Install flooring in recessed floor access covers, maintaining floor pattern.
- G. At movable partitions, install flooring under partitions without interrupting floor pattern.
- H. Coordinate with Section 09 6513 - Resilient Bases and Accessories for installation of floor moldings, stair coverings, and resilient base.

3.04 INSTALLATION - SHEET FLOORING

- A. Installed sheet flooring shall be without open cracks, raising and puckering at joints, bubbling, telegraphing of adhesive spreader marks, and other imperfections.
- B. Unless otherwise indicated 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.
- C. Install resilient sheet flooring in floor patterns indicated on Drawings.
- D. Cut sheet at seams in accordance with manufacturer's instructions.
- E. Seal seams by heat welding per ASTM F1516.
 - 1. Permanently fuse joint together using welding rod.
 - 2. Finish seams flush with adjacent flooring material.
- F. Coved Base: Install as detailed on drawings, using coved base filler as backing at floor to wall junction. Extend sheet flooring vertically to height indicated, and cover top edge with metal cap strip.

3.05 CLEANING

- A. Remove excess adhesive from floor surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.06 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 6513 - RESILIENT BASES AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient base.
- B. Floor moldings.

1.02 REFERENCE STANDARDS

- A. ASTM F1861 - Standard Specification for Resilient Wall Base 2016.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Verification Samples:
 - 1. Resilient Base, Floor Moldings, and Stair Coverings: Submit 3 samples, 12 inches long illustrating color, pattern, and profile for each accessory specified.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Wall Base: Quantity equal to 2 percent of total installed, but not less than 8 linear feet of each type and color.
 - 3. Extra Stair Covering Materials: Quantity equal to 2 percent of total installed, but not less than 8 linear feet for each type and color.
 - 4. Extra Floor Moldings: Quantity equal to 2 percent of total installed, but not less than 8 linear feet of each type and color.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified resilient accessories with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in installing specified resilient accessories with minimum 5 years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

1.06 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 RESILIENT BASE

- A. RB1 Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
 - 1. Manufacturers: Provide products from one of the following:
 - a. Armstrong Flooring Inc.: www.armstrongflooring.com.
 - b. Burke Flooring: www.burkeflooring.com.
 - c. Johnsonite, a Tarkett Company: www.johnsonite.com.

- d. Roppe Corp: www.roppe.com.
- e. Substitutions: See Section 01 6000 - Product Requirements.
2. Height: 4 inch.
3. Thickness: 0.125 inch.
4. Finish: Satin.
5. Length: Roll.
6. Colors: To match Johnsonite, Charcoal 20.

2.02 FLOOR MOLDINGS

- A. Floor Moldings: Resilient edge and transition strips for changes in flooring materials.
 1. Manufacturers:
 - a. Armstrong Flooring Inc.: www.armstrongflooring.com.
 - b. Burke Flooring: www.burkeflooring.com.
 - c. Johnsonite, a Tarkett Company: www.johnsonite.com.
 - d. Roppe Corp: www.roppe.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
 2. Material: Rubber or vinyl as is standard with manufacturer.
 3. Profiles: As standard with manufacturer and as appropriate for floor finishes, unless otherwise indicated.
 4. Provide floor moldings at the following locations unless otherwise indicated:
 - a. Open perimeters of resilient flooring; reducer strips.
 - b. Open perimeters of carpeting; edge guards.
 - c. Changes in floor finishes from resilient flooring to carpeting; transition strips.
 - d. Other areas as indicated or required for complete floor finish installations.
 5. Colors: As selected by Architect from Manufacturer's full line.

2.03 ACCESSORIES

- A. Primers and Adhesives: Waterproof; types recommended by accessories manufacturer.
- B. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to stair covering manufacturer, free of cracks that might telegraph through stair coverings, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of stair coverings to substrate.
- B. Verify that surfaces are flat, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of floor moldings to substrate.
- C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

3.02 PREPARATION

- A. Clean substrates.

3.03 INSTALLATION - GENERAL

- A. Install in accordance with manufacturer's written instructions.
- B. Adhesive-Applied Installation:
 1. Fully adhere resilient base, stair coverings, and floor moldings, to substrates using a full spread of adhesive completely covering substrate.
 2. Spread only enough adhesive to permit installation of materials before initial set.
 3. Fit joints and butt seams tightly.
- C. Install floor moldings at unprotected or exposed edges, where flooring terminates, and where indicated.
 1. Resilient Strips: Attach to substrate using adhesive.

3.04 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Install with minimal amount of joints; tops of adjacent pieces shall be aligned.
- C. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.
- D. Install base on solid backing. Bond tightly to wall and floor surfaces.
- E. At masonry and other irregular substrates fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
- F. Scribe and fit to door frames and other interruptions.

3.05 INSTALLATION - FLOOR MOLDINGS

- A. Install floor moldings in one piece for full width of installation, where possible.
- B. Where joints are unavoidable, fit tightly together and align adjacent molding profiles.
- C. Adhere over entire surface. Fit accurately and securely.

3.06 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.

3.07 PROTECTION

- A. Prohibit traffic on resilient stair coverings and floor moldings for 48 hours after installation.

END OF SECTION

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TMP19040
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SECTION 09 6566 - RESILIENT ATHLETIC FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vinyl sheet flooring, adhesively installed.

1.02 RELATED REQUIREMENTS

- A. Section 09 0561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

1.03 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016.
- B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015, with Editorial Revision (2017).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, and layout, colors, and widths of game lines and equipment locations.
- D. Selection Samples: Manufacturer's color charts for flooring materials specified and game line paints, indicating full range of colors and textures available.
- E. Verification Samples:
 - 1. Resilient Flooring: Submit 3 samples, 8 inch square, illustrating color and pattern for each resilient flooring product specified.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum 5 years documented experience and approved by flooring manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

1.07 FIELD CONDITIONS

- A. Maintain temperature in spaces to receive adhesively installed resilient flooring within range of 70 to 95 degrees F for not less than 48 hours before the beginning of installation and for not less than 48 hours after installation has been completed. Subsequently, do not allow temperature in installed spaces to drop below 50 degrees F or to go above 100 degrees F.

PART 2 PRODUCTS

2.01 PREFORMED ATHLETIC FLOORING

- A. RSF1 Vinyl Sheet Flooring:
 - 1. Product: Gerflor; Taraflex Sport M Plus Dry-Tex: www.gerflorusa.com
 - a. Substitutions: Not permitted.
 - 2. Wearing Surface: Pure polyvinyl chloride, mechanically extruded and uniformly resilient material with uniform color throughout thickness.
 - 3. Backing: Foamed plastic.
 - 4. Sheet Thickness: Minimum 0.3 inch (7.5 mm).

5. Sheet Width: Minimum 59 inches.
6. Sheet Lengths: As necessary to minimize transverse seams.
7. Tensile Strength: Minimum 1000 psi, per ASTM D412.
8. Durometer Hardness, Type A: Minimum of 65, when tested in accordance with ASTM D2240.
9. Seaming Method: Welding with heat or chemical.
10. Surface Texture: Smooth.
11. Color: Maple Design (6381).
12. Game Lines: Paint as approved by manufacturer of vinyl sheet flooring.
 - a. Game Line Color(s):
 - 1) Line Color A: Black (6830)
13. Manufacturer's Representative: Tony Britsky (248) 879-8779

2.02 ACCESSORIES

- A. Leveling Compound: Latex-modified cement formulation as recommended by flooring manufacturer for substrate conditions.
- B. Flooring Adhesive: Waterproof; types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of athletic flooring. Proceed with installation only after unsatisfactory conditions have been corrected.
- 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 athletic flooring to substrate.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 1. Test in accordance with Section 09 0561 - Common Work Results for Flooring Preparation.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Concrete: Use leveling compound as necessary to achieve substrate flatness of plus or minus 1/8 inch within 10 ft radius.
- C. Remove coatings that are incompatible with flooring adhesives, using methods recommended by flooring manufacturer.
- D. Broom clean areas to receive athletic flooring immediately before beginning installation.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.

3.04 CLEANING

- A. Clean flooring using methods recommended by manufacturer.

3.05 PROTECTION

- A. Protect finished athletic flooring from construction traffic to ensure that it is without damage upon Date of Substantial Completion.

END OF SECTION

SECTION 09 6700 - FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fluid-applied flooring and base.

1.02 RELATED REQUIREMENTS

- A. Section 03 3511 - Concrete Floor Finishes.

1.03 REFERENCE STANDARDS

- A. ASTM C307 -Standard test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing; 2018.
- B. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes 2018.
- C. ASTM C580 - Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes 2018.
- D. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine 2017.
- E. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015, with Editorial Revision (2017).
- F. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers 2017.
- G. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2018.
- H. ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser 2019.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- C. Selection Samples: Manufacturer's color charts for flooring materials specified, indicating full range of colors and textures available.
- D. Samples:
 - 1. Submit 3 samples, 8 by 8 inch in size illustrating color and pattern for each floor material for each color specified.
 - 2. Stepped Flooring Samples: Submit 1 sample, 2 inches wide by 8 inches, stepped to show each layer of the finish system from base material to final top coating.
- E. Manufacturer's Qualification Statement.
- F. Applicator's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Primer: 1 gallons.
 - 3. Receiving Coats: 1 gallons.
 - 4. Aggregate: As recommended by manufacturer for 1 gallons of receiving coats.
 - 5. Intermediate or Grout Coat: 1 gallons
 - 6. Top Coat: 1 gallons.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 5 years documented experience.

- B. Applicator Qualifications: Company specializing in performing the work of this section.
 - 1. Minimum 5 years of documented experience.
 - 2. Approved by manufacturer.

1.06 MOCK-UP

- A. Construct mock-up(s) of fluid applied flooring to serve as basis for evaluation of texture and workmanship.
 - 1. Number of Mock-Ups to be Prepared: One.
 - 2. Use same materials and methods for use in the work.
 - 3. Locate where directed.
 - 4. Minimum Size: 48 inches by 48 inches.
- B. See Section 01 4000 - Quality Requirements for additional requirements.
- C. Obtain approval of mock-up by Architect before proceeding with work.
- D. Approved mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store resin materials in a dry, secure area.

1.08 FIELD CONDITIONS

- A. Maintain minimum temperature in storage area of 55 degrees F.
- B. Store materials in area of installation for minimum period of 24 hours prior to installation.
- C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.01 FLUID-APPLIED FLOORING SYSTEMS

- A. FCS1Fluid-Applied Flooring: Epoxy base coat(s) with broadcast aggregate and urethane top coat.
 - 1. System Thickness: Minimum 1/8 inch, nominal, when dry.
 - 2. Primer: Epoxy.
 - 3. Receiving Coats: Epoxy.
 - 4. Aggregate: Quartz granules.
 - 5. Intermediate or Grout Coats: Epoxy, if any.
 - 6. Top Coat: Urethane.
 - 7. Texture: Slip resistant.
 - 8. Sheen: Gloss.
 - 9. Color: As selected by Architect
 - 10. Built-Up Cove Base: 4 inches
 - 11. System Performance Requirements:
 - a. Hardness (Shore D): 70-90; ASTM D2240.
 - b. Compressive Strength: 8,000 psi, minimum; ASTM C579.
 - c. Tensile Strength: 1,100 psi, minimum; ASTM C307.
 - d. Flexural Strength: 3,500 psi, minimum; ASTM C580.
 - e. Abrasion Resistance: 100 mg, maximum; ASTM D4060, CS17, 1000 gr load, 1000 cycles.
 - f. Adhesion to Concrete: 300 psi, minimum; ASTM D4541.
 - g. Coefficient of Friction: Greater than 0.6; ASTM D2047.
 - h. Flammability: Self-extinguishing; ASTM D635.
 - 12. Products: Subject to compliance with requirements, provide one of the following:
 - a. The Sherwin-Williams Company/General Polymers; Ceramic Carpet #400: www.generalpolymers.com.
 - b. Tennant Company; Decorative Quartz System - Tennant Epoxy Quartz SR-HTS: www.tennantcoatings.com.
 - c. Tnemec Company, Inc.; Deco-Tread Series 222: www.tnemec.com.
 - d. Substitutions: Section 01 6000 - Product Requirements.

- B. [FSC2]Fluid-Applied Flooring at Floor Decals: Epoxy base coat(s), polyurethane top coat, with aggregate.
 - 1. System Thickness: 40 mils, nominal, when dry.
 - 2. Texture: Slip resistant.
 - 3. Sheen: gloss.
 - 4. Aggregate: Glass Beads
 - 5. Pattern as indicated on Drawings.
 - 6. Color: Five (5) custom colors to match Architect's sample.
 - 7. Basis of Design Product: Tnemec Company; Series 205 Terra-Tread FC.
- C. [FCS3]Fluid-Applied Flooring: Single Coat Urethane Sealer with Slip Resistance.
 - 1. System Thickness: 3 mils, nominal, when dry.
 - 2. Texture: Slip resistant.
 - 3. Sheen: Semi-Gloss
 - 4. Color: Clear
 - 5. Basis of Design Product: [Tnemec Company; Series 248 Everthane with Part C Aluminum Oxide].
 - 6. Note: Product to be used over top of dyed concrete. Densifier and sealer must not be applied. See section 033511 - Concrete Floor Finishes.

2.02 ACCESSORIES

- A. Cove Base Cap Strip: As standard with fluid-applied flooring manufacturer.
 - 1. Material: Vinyl.
 - 2. Profile: Manufacturer's standard profile.
- B. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 0561 - Common Work Results for Flooring Preparation.

3.02 PREPARATION

- A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler. Comply with requirements of fluid-applied flooring manufacturer.
- B. Vacuum clean substrate.
- C. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - ACCESSORIES

- A. Install terminating cap strip at top of base; attach securely to wall substrate.

3.04 INSTALLATION - FLOORING

- A. Apply in accordance with manufacturer's instructions.
 - 1. Install primer as recommended by fluid-applied flooring manufacturer.
 - 2. Install 2 layers of broadcast aggregate, minimum, and accompanying receiving coats as recommended by fluid-applied flooring manufacturer..
 - 3. Install intermediate or grout coat as recommended by fluid-applied flooring manufacturer.
 - 4. Install top coat as recommended by fluid-applied flooring manufacturer.
- B. Apply each coat to minimum thickness required by manufacturer.

- C. Finish to smooth level surface, with slip resistant finish.
- D. Cove at vertical surfaces.
- E. Where indicated, extend fluid-applied flooring vertically to height indicated, and cover exposed top edge terminations with resilient cap strip.

3.05 **PROTECTION**

- A. Prohibit traffic on floor finish for 48 hours after installation.

END OF SECTION

SECTION 09 6813 - TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Carpet tile, fully adhered.

1.02 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials 2016.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- C. CRI 104 - Standard for Installation of Commercial Carpet 2015.
- D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2019.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.
- D. Verification Samples:
 - 1. Carpet Tile: Submit 3 samples, full size, for each color and pattern specified.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Carpet Tiles: Quantity equal to 2 percent of total installed, but not less than one box for each type and color.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum 5 years documented experience.

1.05 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

1.06 EXTRA MATERIALS

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 - 1. Carpet Tile Flooring: Furnish not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern and size installed.

PART 2 PRODUCTS

2.01 MATERIALS

- A. CPT1Tile Carpeting:
 - 1. Product:
 - a. Tarkett; SquareUp (04990): .
 - b. Substitutions: Not permitted.
 - 2. Construction: Stratatec® Patterned Loop.
 - 3. Tile Size: 24 by 24 inch, nominal.
 - 4. Color:
 - a. CPT1A Electricity (71604).

- b. CPT1B Stormtrooper (71607).
 5. Installation Pattern: Vertical Ashlar.
 6. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
 7. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 8. Fiber Content: Antron Lumena® Nylon.
 9. Dye Method: 100% solution dyed.
 10. Density Factor: 6,128 oz/cu yd .
 11. Secondary Backing Material: ethos® Modular with Omnicoat Technology™.
- B. CPT2Tile Carpeting: Refer to Alternate No. 7 for expanded scope.
1. Product:
 - a. Tarkett; Assertive Action (04837): .
 - b. Substitutions: Not permitted.
 2. Construction: Symtex® .
 3. Tile Size: 24 by 24 inch, nominal.
 4. Color(s):
 - a. CPT2A Chromium (26201).
 - b. CPT2B Blue Flame (26210).
 - c. CPT2C Tungsten (26205).
 - d. [CPT2D] [Flashing (26208)].
 - e. [CPT2E] [Red Oxide (26220)].
 - f. [CPT2F] [Gold Ore (26204)].
 5. Installation Pattern: Monolithic.
 6. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
 7. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 8. Fiber Content: TDX® Nylon.
 9. Dye Method: 100% Solution Dyed .
 10. Density Factor: 10,989 oz/cu yd .
 11. Secondary Backing Material: ethos® Modular with Omnicoat Technology™.

2.02 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.
- C. Floor Moldings and Resilient Base: Refer to Section 09 6513 - Resilient Bases and Accessories.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 1. Test in accordance with Section 09 0561 - Common Work Results for Flooring Preparation.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.

- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions and CRI 104 (Commercial).
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Install carpet tile in floor patterns indicated.
- F. Locate change of color or pattern between rooms under door centerline.
- G. Trim carpet tile neatly at walls and around interruptions.
- H. Coordinate with Section 09 6513 - Resilient Bases and Accessories for installation of floor moldings and resilient base.

3.04 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION

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Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

TILE CARPETING
09 6813-4

SECTION 09 7200 - WALL COVERINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Acoustical Wall coverings.

1.02 RELATED REQUIREMENTS

- A. Section 064023 - Interior Architectural Woodwork.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on wall covering and adhesive.
- C. Shop Drawings: Indicate wall elevations with seaming layout.
- D. Samples: Submit 3 samples of each wall covering, 8 by 10 inch in size illustrating color, finish, and texture.
- E. Test Reports: Indicate verification of flame and smoke ratings, when tested by an agency approved by authority having jurisdiction.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Wall Covering Materials: 25 linear feet of each color and pattern of wall covering.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years of documented experience.

1.06 MOCK-UP

- A. Provide panel, 8 feet wide, full height, illustrating installed wall covering and joint seaming technique.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Inspect roll materials at arrival on site, to verify acceptability.
- B. Protect packaged adhesive from temperature cycling and cold temperatures.
- C. Do not store roll goods on end.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.
- B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

PART 2 PRODUCTS

2.01 WALL COVERINGS

- A. General Requirements:
 - 1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84.
- B. FWCFabric Wall Covering: Acoustical Fabric Wall Covering.

1. Products:
 - a. Momentum; D.L. Couch: AcoustiCord Wall Carpet.
 - b. Substitutions: Not permitted.
2. Color: Heather (ACS-32) .
3. Width: 79 inches.
4. Thickness: 0.2 inches
5. Weight: 60 oz/sq yd
6. Installation Direction: Horizontal Rib
- C. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.
- D. Substrate Primer and Sealer: Water-based type recommended by wall covering manufacturer to suit application to substrate. Allows for easy removal of wall coverings.
- E. Accessories: J Cap Trim; 3/16 inch as needed; miter corners. Trim with hardwood as indicated on Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work, and comply with requirements of wall covering manufacturer.
- B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.
- C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.02 PREPARATION

- A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Apply two coats of primer sealer to substrate surfaces in accordance with manufacturer's instructions. Allow to dry. Lightly sand smooth.
- C. Vacuum clean surfaces free of loose particles.

3.03 INSTALLATION

- A. Apply adhesive and wall covering in accordance with manufacturer's instructions.
- B. Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.
- C. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface.
- D. Butt edges tightly.
- E. Horizontal seams are not acceptable, unless otherwise indicated.
- F. Do not seam within 2 inches of internal corners or within 6 inches of external corners.
- G. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.04 CLEANING

- A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.
- B. Reinstall wall plates and accessories removed prior to work of this section.

3.05 PROTECTION

- A. Do not permit construction activities at or near finished wall covering areas.

END OF SECTION

SECTION 09 7716 - FRAMED DECORATIVE PANEL SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: This Section specifies decorative prefinished panel with pre-engineered attachment clip, along with hardware and trim systems for installation directly to studs or solid substrate and may include:
 - 1. Wood veneer on fiber board substrate panels.
 - 2. Hardware.
- B. Related Requirements:
 - 1. Section 06 1000 - Rough Carpentry.
 - 2. Section 09 2216 - Non-Structural Metal Framing.
 - 3. Section 09 9200 - Gypsum Board.

1.02 REFERENCES

- A. Reference Standards:
 - 1. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use 2016.
 - 2. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018)

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Locate trim members to ensure panel lines coordinate with doors, headers, jambs and other discontinuities in walls.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's standard specifications and descriptive literature, including: Product Characteristics.
- C. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to discontinuities in wall elevation.
- D. Samples:
 - 1. Samples for Selection: Submit manufacturer's standard color and pattern selection samples representing manufacturer's full range of available colors and patterns.
 - 2. Samples for Verification: Submit sample for each component and for each exposed finish required, prepared on samples of size indicated below complete with exposed molding and trim samples.
 - a. Ensure samples indicate type, finish and color specified.
 - 1) Wood Veneers: Submit sample sets of Marlite Signature Select AA Grade wood veneer with finish choice.
 - (a) Ensure 6 x 6 inch sample shows full range of normal color and texture variations anticipated.
 - (b) Include sample of Classic Clear Topcoat.
- E. Manufacturer's written instructions, including:
 - 1. Delivery, storage and handling recommendations.
 - 2. Preparation and installation recommendations.
- F. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- G. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.
- H. Manufacturer's Field Reports: Submit manufacturer's field reports within 3 days of each manufacturer representative's site visit and inspection.
- I. Installer's Experience: Submit verification of evidence of work similar to the work of this Section.

- J. Warranty: Fully executed, issued in Owner's name and registered with manufacturer, including:
 - 1. Manufacturer's 30-day warranty covering defects in materials.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Supply maintenance data for framed decorative panel system for incorporation into manual specified in Section 01 78 00 Closeout Submittals.
- B. Record Documentation: In accordance with Section 01 7800 Closeout Submittals.
 - 1. List materials used in framed decorative panel system work.
 - 2. Warranty: Submit warranty documents specified.

1.06 QUALITY ASSURANCE

- A. Installer: Experienced in performing work similar to work of this Section.

1.07 DELIVERY, STORAGE & HANDLING

- A. Deliver materials in accordance with manufacturer's written instructions.
 - 1. Deliver materials on strong pallets in manufacturer's original, unopened, undamaged containers with identification labels intact and product name and manufacturer clearly visible and in sizes to suit project.
 - 2. Inspect each package for damage and promptly contact Marlite, Inc. directly to report damaged packages or missing components
- B. Store materials in manufacturer's unopened packaging until ready for installation.
 - 1. Maintain temperature range of 60° to 80°F and humidity range of 35 to 55 percent during storage, installation and product life cycle.
 - 2. Maintain plastic or other protective wrap in place during on site handling until ready for installation.
 - 3. Keep panels clean and do not stack panels after removal of protection.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.08 FIELD CONDITIONS

- A. Do not use wood or fiber board products in kitchens, rest rooms, or other high humidity areas.
- B. Maintain environmental conditions (temperature, humidity and ventilation) within limits in accordance with manufacturer's written recommendations for optimum results.
 - 1. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

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

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Basis-of-Design: Marlite, Inc.: www.marlite.com
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Burn Characteristics to ASTM E84, Class A.
 - 1. Flame spread: 0-25.
 - 2. Smoke Developed 0-450.
- B. Burn Characteristics to ASTM E84, Class C.
 - 1. Flame spread: 76-200.
 - 2. Smoke Developed 0-450.

2.03 DESCRIPTION

- A. Clip-on 3/4 inch thick decorative wall panel system including flat panels and curved panels and associated mounting equipment and trim.

2.04 HARDWARE

- A. Panel Trim:
 - 1. Reveal:
 - a. Horizontal: 1/4 inch narrow.
 - b. Vertical: 1/4 inch narrow.
 - c. Edge Trim and Inside Corner Trim.
- B. Hardware and Trim Material:
 - 1. Aluminum - Heavy weight extruded aluminum 6063-T5 alloy and factory prefinished.
 - a. Main rail: 1/4 inch narrow.
 - b. Cross spline: 1/4 inch narrow.
 - c. Concealed aluminum: Mill finished.
 - d. Exposed aluminum: Clear satin anodized.

2.05 PANELS

- A. Panel Configuration: Face dimensions: As indicated.
 - 1. Maximum of 48 inches along unsupported frame.
 - 2. Panel thickness: 3/4 inches maximum.
- B. Wood Fiber Substrate:
 - 1. Medium density wood fiberboard, 3/4 inch, conforming to ANSI A208.2, industrial-grade MDF or other wood fiber substrates 75 percent minimum recycled wood waste and having no added formaldehyde.
- C. Wood Veneer Panels: Select AA grade quality wood veneer laminated to wood fiber substrate and coated with furniture grade catalyzed finish as protective topcoat.
 - 1. Edges: Square cut and finished.
 - 2. Balancing Backer: Wood veneer measuring between 0.015 and 0.025 inches.
 - 3. Veneer Face: 0.010 to 0.015 inches with catalyzed finish of approximately 0.003 inches.
 - 4. Matching between panels: Manufacturer's standard non-sequenced matching.
 - 5. Species and Cut: Maple.
 - a. Grain direction: Vertical.
 - 6. Finish: Classic Clear Topcoat.
 - 7. Basis-of-design Material: Marlite Surface Systems MAP Wood Veneer Panels.

2.06 ACCESSORIES

- A. Adhesives: Solvent based low VOC adhesive.
 - 1. Acceptable Material Basis-of-Design: Marlite C-109 Solvent Based Adhesive.

2.07 FABRICATION

- A. Ensure framing panels, hardware and accessories are factory finished and ready to install except for field fabrication as required at work site and perimeter conditions.
 - 1. Refinish field cut panel edges in accordance with manufacturer's instruction before installation.
 - 2. Drill corners for cut-outs 1/8 inch radius minimum.

PART 3 EXECUTION

3.01 INSTALLER

- A. Use only installers who have training and experience of work similar to the work of this Section.

3.02 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for framed decorative panel system installation in accordance with manufacturer's written recommendations.
 - 1. Visually inspect substrate in presence of Architect.

2. Ensure substrate is smooth, sound, clean, dry and free of contaminants and other deleterious materials.
 3. Ensure backing panels are smooth, solid, and flat and that drywall joints are taped and finished.
 4. Ensure walls are primed before installation begins.
 5. Ensure mechanical, electrical and building service or items affecting work of this section are placed and ready to receive this work.
 6. Ensure stud spacing does not exceed 24 inches.
 7. Inform Architect of unacceptable conditions immediately upon discovery.
 8. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Architect.
 9. Starting installation of framed decorative panel system implies substrate conditions are acceptable for work of this section.
- B. Ensure structural walls are finished and building is completely closed with walls thoroughly dry before starting installation.

3.03 PREPARATION

- A. Conditioning: Allow panels to acclimate to balanced environment in installation location for 72 hours minimum before and during installation.
1. Maintain environmental conditions of 60 degrees to 80 degrees F and 35 to 55 percent humidity in installation location for 72 hours before and during installation.
- B. Protect existing surfaces with drop cloths.
- C. Except as indicated, before installing, examine panels and arrange to achieve best combination of color, pattern, texture and grain.
- D. Ensure HVAC system is operable and installation area is balanced to normal operating conditions before proceeding with installation.

3.04 INSTALLATION

- A. Install framed decorative panel system in accordance with manufacturer's written recommendations.
- B. Install materials straight, plumb and level in accordance with manufacturer's written instructions.
1. Anchor units tightly and securely in place.
 2. Cut sheets to meet existing supports.
- C. Fasten supports and trim using #6 trim-head screws anchored into stud or other solid substrate at 16 inch centers.
1. Where screws do not hit studs, fasten with adhesive in accordance with manufacturer's written recommendations.
 2. Pre-drill holes through members and fasten screw flush with flange on aluminum profile.
 3. Where necessary countersink for screw head to seat flush with flange.
- D. Avoid contamination of the panel faces with adhesives, solvents or cleaners during installation.
1. Clean up spills immediately.

3.05 FIELD QUALITY CONTROL

- A. See section 01 4000 Quality Requirements, for general testing and inspection requirements.
- B. Provide services of manufacturer field representative to observe for proper installation of system and submit report.

3.06 CLEANING

- A. Perform daily progress cleaning.
1. Leave work area clean at end of each day.
- B. Upon completion, remove surplus materials, rubbish, tools and equipment.
- C. Collect recyclable waste and dispose of in accordance with manufacturer's written recommendations and at appropriate recycling facilities.

3.07 PROTECTION

- A. Protect installed framed decorative panel system from damage during construction.
- B. Repair or replace adjacent materials damaged by installation of framed decorative panel system.

END OF SECTION

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SECTION 09 8129 - SPRAYED ACOUSTIC INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Spray Applied Acoustic Thermal Insulation

1.02 REFERENCES

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- C. ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2017.
- D. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2016

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, and preparation requirements.
- C. Shop Drawings: Show materials and details include plan of installation locations.
- D. Documentation of the manufacturer's ISO 9001 - Quality management systems -- Requirements; 2015.
- E. Test reports/technical data confirming that the product meets the performance requirements.
- F. Copy of the manufacturer's certification that the product does not contain silica, asbestos, fiberglass, or other man-made mineral fibers.
- G. Samples: provide 4 inch by 4 inch sample of sprayed insulation bonded to a piece of rigid board.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than five (5) years of documented experience.
- B. Installer Qualifications: All firms of applicators performing the Work of this Section must be approved by the manufacturers of the sprayed thermal material and shall also have been in business for a minimum period of three (3) years.

1.06 MOCK-UP

- A. Construct mock-up, 4 feet long by 8 feet wide.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.07 FIELD CONDITIONS

- A. Work on this Section shall only be performed under the conditions stated in the manufacturer's printed application instructions.
- B. Sufficient heat and ventilation must be provided at all times during installation and drying of spray insulation according to manufacturer's printed instructions.
- C. Allow the manufacturer's representative full access to the site.
- D. PATCHING: All patching and repairing of sprayed thermal insulation due to cutting by other trades shall be performed under this Section and paid for by the trade performing the cutting.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Spray-applied materials Basis-of-Design: SONOGLASS Spray-On White Fiber conforming to ASTM E84, ASTM C423 and ASTM C518 using MONOGLASS Liquid Bonding Adhesive manufactured by Monoglass Incorporated.
 - 1. SonoKrete Acoustical Finish System
 - 2. Substitutions: See Section 01 6000 - Product Requirements
- B. Thermal /acoustic insulation shall not contain asbestos, free crystalline silica or combustible fibers, and shall exhibit the following properties:

| PROPERTY | TEST METHOD | RESULTS |
|------------------------------------|-----------------------|--|
| FIRE HAZARD CLASSIFICATION | ASTM E84-07 | FLAME SPREAD = 0 SMOKE DEVELOPED = 0 |
| AIR EROSION | ASTM E859 | 0.11 GRAM MASS LOSS |
| DRY DENSITY | ASTM D-1622-83 | 3.0 POUNDS/CUBIC FOOT |
| THERMAL CONDUCTIVITY | ASTM C-518 | R-VALUE 3.73/INCH |
| NOISE REDUCTION COEFFICIENT | ASTM C-423 | NRC = 1.00 @ 1.7" ON SOLID BACKING NRC = 0.75 @ 0.8" ON SOLID BACKING |

- C. MONOGLASS Bonding Adhesive shall be mixed with fresh, clean water to the exact proportions recommended by the manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine all surfaces and conditions to which the work of this section is to be applied. Ensure they are adequate to provide a satisfactory application of the specified materials. Report any deficiencies to the design authority.

3.02 PREPARATION

- A. Remove any dust, dirt, foreign material, loose paint etc. on surfaces to which the work is to be applied, which could otherwise create a false bond or staining of insulation. Clean and seal as required.
- B. Verify bond requirements and compatibility of all surfaces to receive thermal insulation materials.
- C. Ensure that all ducts, piping, equipment, or other items, which would interfere with application of thermal insulation, are not positioned until thermal insulation work is completed.

3.03 APPLICATION

- A. Mix and apply thermal insulation in strict accordance with manufacturer's recommendations.
- B. Apply insulation to the substrate as specified in the site drawings.
- C. Apply insulation to substrate in sufficient thickness to achieve required thermal (acoustic) value.
 - 1. Fill roof deck flutes plus an additional 2 inches of thickness, minimum.
 - 2. Achieve minimum STC value of 55.

3.04 CLEAN-UP

- A. Remove sprayed thermal insulation from material and surfaces not specifically required to be insulated.
- B. Broom clean work areas affected by the Work of this Section.

3.05 TAMPING & OVER-SPRAY

- A. Board tamp sprayed insulation surface and apply Monoglass adhesive to seal the tamped insulation surface, in accordance with manufacturer's written instructions.

3.06 PROTECTION

- A. Provide adequate protection to adjacent surfaces from being sprayed by means of drop cloths, polyethylene sheets, with necessary taping.
- B. Close off and seal any ductwork in areas where sprayed insulation is being applied.

3.07 OPTIONS

- A. Paint as required, or apply spray insulation using manufacturer's pre-tinted adhesives, as per manufacturer's instructions.

3.08 SURFACE PROTECTION

- A. **PATCHING:** All patching and repairing of sprayed thermal insulation due to cutting by other trades shall be performed under this Section and paid for by the trade performing the cutting.
- B. If surface protection is required, spray-apply InsulSeal protective coating to desired thickness as indicated on coverage chart.

END OF SECTION

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SECTION 09 8433 - ACOUSTIC WALL UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Absorption panels:
 - 1. Fabric-wrapped, glass-fiber board panels.

1.02 REFERENCE STANDARDS

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2017.
- B. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests 2016.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's printed data sheets for products specified.
- B. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation.
- C. Verification Samples: Submit 3 samples of each type and finish of panel specified; 12 by 12 inch, showing construction, edge details, finish, and mounting method.
- D. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company with not less than five years of experience in manufacturing acoustical products similar to those specified.
- B. Installer Qualifications: Company specializing in installing acoustic wall units with minimum 5 years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.
- B. Store units flat, in dry, well-ventilated space; do not stand on end.
- C. Protect edges from damage.

1.06 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for additional mock-up requirements.
- B. For each type of acoustical wall unit, build mockup of typical wall area include a minimum of 2 acoustical wall units. Include typical joint between acoustical wall units. Construct mock-ups of acoustical units at locations indicated by Architect.
 - 1. Approved mock-ups may remain as part of the Work.

PART 2 PRODUCTS

2.01 FABRIC-WRAPPED GLASS-FIBER BOARD PANELS

- A. Drawing Designations: AWP1
- B. Products:
 - 1. Acoustic Surfaces, Inc; Fabrisorb High Impact: www.acousticalsurfaces.com.
 - 2. Conwed Designscape/Wall Technology, an Owens Corning company; Respond IR Series www.conweddesignscape.com.
 - 3. Decoustics, a Saint-Gobain company; High Impact Resistant Wall Panel (H.I.R. #1): www.decoustics.com.
 - 4. MBI Products Company, Inc; Colorsonix: www.mbiproducts.com.
 - 5. Sound Concepts; HIR 1 - High Impact: www.soundconceptscan.com.
 - 6. Sound Seal, Inc; S-2100 High Impact: www.soundseal.com.
 - 7. Substitutions: See Section 01 6000 - Product Requirements.
- C. Panel Core: Manufacturer's standard rigid glass-fiber board; complying with ASTM C612.

1. Density: 6 to 7 lb/cu ft.
- D. Facer: Manufacturer's standard high-density, impact-resistant, glass-fiber facer; laminated to core.
 1. Thickness: 1/8 inch.
 2. Density: 16 to 20 lb/cu ft.
- E. Edges: Perimeter edges reinforced by a formulated resin hardener.
- F. Fabrics:
 1. AWP1
 - a. Products:
 - 1) Carnegie; Xorel, Meteor 6427: Website.
 - 2) Substitutions: Not permitted.
 - b. Colors:
 - 1) Color A: 731 (teal)
 - 2) Color B: 729 (green)
 - 3) Color C: 748 (purple)
 - 4) Color D: 715 (orange)
 - 5) Color E: 712 (yellow)
 - 6) Color F: 765 (white)
- G. Panel Shape: Flat.
- H. Edge Profile: Square.
- I. Corner Detail in Elevation: Square, unless otherwise indicated.
- J. Nominal Overall Panel Thickness:
 1. AWP1: 1-1/8 inch.
- K. Panel Sizes and Shapes - Width and Height: As indicated on Drawings.
- L. Mounting Method: Back mounted with manufacturer's standard metal z-clips.
- M. Performance Requirements:
 1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 2. Noise Reduction Coefficient (NRC):
 - a. 1-1/8 inch panels: 1.0 when tested in accordance with ASTM C423 for Type A mounting, per ASTM E795.

2.02 FABRICATION

- A. Use manufacturer's standard methods of construction; fabricate panels to sizes and configurations as indicated.
- B. Provide cutouts for electrical outlets and similar items.
- C. Fabric facings shall be installed without sagging, wrinkles, blisters, or visible seams.
 1. Where radiused or mitered corners are indicated, install fabric to avoid seams or gathering of material.
- D. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and squareness from corner to corner.

2.03 ACCESSORIES

- A. Spline-Mounting Accessories: Manufacturer's standard concealed connecting splines of extruded aluminum or plastic designed for screw attachment to walls, with coordinating moldings and trim for miscellaneous conditions.
- B. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support, designed to allow panel removal, and as follows:
 1. Designed to support full weight of panels and provide lateral support, with one part mechanically attached to back of panel and the other attached to substrate.
- C. Furring Strips: Wood furring, minimum 2 inches wide by depths indicated; straight and without significant knots or other defects.

- D. Panel Adhesive: Acceptable to acoustical panel manufacturer for application as indicated.
 - 1. Products:
 - a. Franklin International, Inc; Titebond GREENChoice Heavy Duty Construction Adhesive; www.titebond.com.
 - b. PPG Architectural Coatings; Liquid Nails LN-903 Heavy Duty Construction Adhesive: www.liquidnails.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.
- B. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
 - 1. Maintain panel joint widths/reveals as indicated
- C. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:
 - 1. Plumb and level.
 - 2. Flatness.
 - 3. Width of joints.

3.03 CLEANING

- A. Clean acoustical units upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

3.04 PROTECTION

- A. Provide protection of installed acoustical panels until Date of Substantial Completion.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

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SECTION 09 8436 - ACOUSTIC CEILING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Baffles:
 - 1. Fabric-wrapped, glass-fiber board baffles.

1.02 RELATED REQUIREMENTS

- A. Section 09 5100 - Acoustical Ceilings.
- B. Section 09 8433 - Acoustic Wall Units.

1.03 REFERENCE STANDARDS

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2017.
- B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation.
- D. Verification Samples: Submit 3 samples of each type and finish of panel specified; 12 by 12 inch, showing construction, edge details, finish, and mounting method.
- E. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company with not less than five years of experience in manufacturing acoustical products similar to those specified.
- B. Installer Qualifications: Company specializing in installing acoustic wall units with minimum 5 years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.
- B. Store units flat, in dry, well-ventilated space; do not stand on end.
- C. Protect edges from damage.

1.07 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for additional mock-up requirements.
- B. For each type of acoustical ceiling unit, build mockup of typical ceiling area include a minimum of 2 acoustical ceiling units. Construct mock-ups of acoustical units at locations indicated by Architect.
 - 1. Approved mock-ups may remain as part of the Work.

PART 2 PRODUCTS

2.01 FABRIC-WRAPPED GLASS-FIBER BOARD BAFFLES

- A. Drawing Designations: ACP1
- B. Products:
 - 1. Acoustic Surfaces, Inc; Fabrisorb Baffles: www.acousticalsurfaces.com.

2. Conwed Designscape/Wall Technology, an Owens Corning company; Respond Baffles Back-to-Back: www.conweddesignscape.com.
 3. Decoustics, a Saint-Gobain company; Type 20 Baffles: www.decoustics.com.
 4. MBI Products Company, Inc; Cloud-Lite Baffles: www.mbiproducts.com.
 5. Sound Concepts; Book Baffles: www.soundconceptscan.com.
 6. Sound Seal, Inc; R-100 Baffles: www.soundseal.com.
 7. Substitutions: See Section 01 6000 - Product Requirements.
- C. Panel Core: One or two pieces of manufacturer's standard rigid glass-fiber board; complying with ASTM C612.
1. Density: 6 to 7 lb/cu ft.
- D. Edges: Perimeter edges reinforced by a formulated resin hardener.
- E. Fabrics:
1. Color: White.
- F. Panel Shape: Flat.
- G. Bottom Edge Profile: Square.
- H. All Other Edges: Square.
- I. Corner Detail in Elevation: Square, unless otherwise indicated.
- J. Nominal Overall Panel Thickness: 2 inches.
- K. Panel Sizes and Shapes - Length and Height: As indicated on Drawings.
- L. Mounting Method: Manufacturer's standard D-rings.
1. Include cables, clamps, and accessories for complete installation; stainless steel material.
- M. Performance Requirements:
1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 2. Sound Asorption:
 - a. 2 inch Panels: 1.75 Sabins/sq. ft. when tested in accordance with ASTM C423.

2.02 FABRICATION

- A. Use manufacturer's standard methods of construction; fabricate panels to sizes and configurations as indicated.
- B. Fabric facings shall be installed without sagging, wrinkles, blisters, or visible seams.
 1. Where contoured surfaces or corners are indicated, install fabric to avoid seams or gathering of material.
- C. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and squareness from corner to corner.

2.03 ACCESSORIES

- A. Mounting Hardware - General: Manufacturer's standard hardware designed to support full weight of panels.
- B. Ceiling-Suspended Accessories: Manufacturer's standard accessories at locations as indicated on each acoustical unit, sized appropriately for weight of acoustical unit.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.
- B. Suspend ceiling baffles at locations and heights as indicated

- C. Set diffuser panels in metal grid suspension system at locations indicated.
- D. Hang suspended panels independent of walls, columns, ducts, pipes and conduit.
 - 1. Connect hangers directly to structure, inserts, eye screws, or other connections that are secure and appropriate for substrate. Connections shall not deteriorate or corrode.
 - 2. Fasten hangers to structural members, cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - a. Do not attach hangers to metal forms, steel deck tabs, or metal decking.
 - 3. Install hangers plumb except where required to miss obstructions; brace splayed hangers as required to offset horizontal forces.
 - 4. Install supplemental hanger supports to bridge large ducts and other wide obstacles that interfere with required hanger spacings or when steel framing is not located appropriately for required hanger spacings.
 - 5. Size hangers and supplemental supports to support panel loads.
 - 6. Hangers shall not contact adjacent materials within the ceiling plenum.
- E. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:
 - 1. Plumb and level.
 - 2. Flatness.
 - 3. Width of joints.

3.03 CLEANING

- A. Clean acoustical units upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

3.04 PROTECTION

- A. Provide protection of installed acoustical panels until Date of Substantial Completion.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

SECTION 09 9100 - PAINTING

PART 1 GENERAL

1.01 SUMMARY

- A. Exterior painting.
- B. Interior painting.
- C. Dryfall painting.
- D. Masonry sealers.
- E. Concrete stains.

1.02 RELATED REQUIREMENTS

- A. Section 09 9600 - High-Performance Coatings: Epoxy paints.

1.03 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section
- B. DFT: Dry film thickness, measured in mils.
- C. WFT : Wet film thickness, measured in mils.

1.04 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. ASTM D1653 - Standard Test Methods for Water Vapor Transmission of Organic Coating Films; 2013.
- D. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2012).
- E. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.
- F. ASTM D523 - Standard Test Method for Specular Gloss; 2014.
- G. ASTM E96/E96M - Standard Test Methods of Water Vapor Transmission of Materials - 2016
- H. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; California Department of Public Health; v1.1, 2010.
- I. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- J. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.
- K. SSPC-SP 1 - Solvent Cleaning; 2015.
- L. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- M. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.05 SUBMITTALS

- A. Refer to Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product data for each paint product. Include complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category.
 - a. Example of general product categories:
 - 1) Interior finish coat - latex, eggshell.
 - 2) Exterior primer for ferrous metal.
 - 2. For each paint system and substrate, indicate which paint products are to be used.
 - a. Examples:
 - 1) Interior latex eggshell system for gypsum board:

- (a) Primer: Name of specific product provided.
 - (b) Finish Coats: Name of specific product provided.
 - 2) Exterior latex semigloss system for ferrous metals.
 - (a) Primer: Name of specific product provided.
 - (b) Finish Coats: Name of specific product provided.
 3. Use same designations indicated on Drawings and Schedules.
- C. Samples: Submit 3 paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating each color and sheen specified.
 1. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry and storefront finishes, have been approved.
- D. Manufacturer's Qualification Statement.
- E. Installer's Qualification Statement.
- F. 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, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. See Section 01 6000 - Product Requirements, for additional provisions.
 2. Extra Paint and Finish Materials: 1 gallon of each color, sheen, and type; from the same product run.
 3. Label each container with color, sheen, and type in addition to the manufacturer's label.
- H. Field Quality Control Reports.

1.06 **QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum 5 years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years documented experience.

1.07 **MOCK-UPS**

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Mock-ups shall demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.
- C. Provide a mock-up for each paint system, substrate, color and sheen as follows:
 1. Vertical and Horizontal Surfaces: Provide mockup samples of at least 100 sq. ft.
 2. Doors and Frames: Provide mock-up samples of one complete door and frame.
 3. Railings and Other Lineal Materials: Provide mock-up samples of at least 8 lineal feet.
 4. Include mock-up for each dryfall paint system and color.
- D. Locate where directed by Architect.
- E. Mock-ups may remain as part of work.

1.08 **DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 **FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by 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 coatings during rain or snow, or when relative humidity is outside humidity ranges required by paint product manufacturer.
- D. Do not apply interior coatings when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- E. Minimum Application Temperatures for Paints: 50 degrees F unless otherwise required by manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paint and coating products from same manufacturer, unless otherwise specified.
 - 1. Exceptions shall be permitted, provided approval of Architect is obtained using specified procedures for substitutions.
- B. Paint Manufacturers.
 - 1. Benjamin Moore: Benjamin Moore & Co.: www.benjaminmoore.com.
 - 2. PPG: PPG Industries, Inc., Architectural Coatings: www.ppgpaints.com.
 - 3. Sherwin-Williams: The Sherwin-Williams Company: www.sherwin-williams.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- C. Sealer Manufacturers.
 - 1. Masonry Sealers:
 - a. United Coatings/GAF: www.gaf.com.
 - b. Substitutions: Not permitted.
- D. Concrete Stain Manufacturers:
 - 1. Benjamin Moore: Benjamin Moore & Co.: www.benjaminmoore.com.
 - 2. H&C: H&C Products Group/Sherwin-Williams: www.hcconcrete.com.
 - 3. PPG: PPG Industries, Inc., Architectural Coatings: www.ppgpaints.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Exclusions:
 - 1. This section excludes epoxy paints and other high performance coatings for the following:
 - a. Interior non-traffic surfaces (epoxy paints).
 - b. Architecturally-exposed structural steel.
 - c. Structural steel, steel joists, and metal decking in natatorium/pool environments.
 - d. Concrete masonry units and concrete in natatorium/pool environments.
 - 2. Refer to Section 09 9600 - High-Performance Coatings.
- B. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
 - 1. 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.
 - 2. 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.
 - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- C. Volatile Organic Compound (VOC) Content and Emissions:
 - 1. Volatile Organic Compound (VOC) Content:

2. 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.
- D. Sheen/Gloss Criteria.
 1. Product names are not acceptable as gloss level identification.
 2. Determine gloss value of paint finish by testing paint samples according to ASTM D523, using 60 degree geometry. Sheen/Gloss levels shall be defined as follows:
 - a. Gloss Level 1: Flat/Matte, value between 0 and 5 units.
 - b. Gloss Level 2: Velvet, value between 5 and 10 units.
 - c. Gloss Level 3: Eggshell, value between 10 and 20 units.
 - d. Gloss Level 4: Satin, value between 20 and 35 units.
 - e. Gloss Level 5: Semigloss, value between 35 and 70 units.
 - f. Gloss Level 6: Gloss, value between 70 and 85 units.
 - g. Gloss Level 7: High Gloss, value more than 85 units.
 3. Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To match Architect's samples unless indicated otherwise on Drawings.
 1. Provide tinted deep tone primers at deep tone colors, and as recommended by paint manufacturer.

2.03 EXTERIOR PAINTS

- A. Exterior Paint Systems - Latex.
 1. Primers: For all sheens unless otherwise indicated.
 - a. Primer for ferrous metal and galvanized steel; one coat.
 - 1) Benjamin Moore; Super Spec HP Acrylic Metal Primer, P04; DFT 2.0 mils.
 - 2) PPG; Pitt-Tech Plus Int./Ext. DTM Industrial Primer, 90-912 Series; DFT 3.0 mils.
 - 3) Sherwin Williams; Pro Industrial Pro-Cryl Universal Primer, B66W310 Series; DFT 3.0 mils
 - b. Primer for previously painted surfaces.
 - 1) Benjamin Moore; Fresh Start High-Hiding All Purpose Primer, 046; DFT 1.4 mils.
 - 2) PPG; Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer, 17-921 Series; DFT 1.6 mils.
 - 3) Sherwin Williams; PrepRite ProBlock Interior/Exterior Latex Primer/Sealer, B51-600 Series; DFT 1.4 mils.
 2. Semi-gloss Sheen.
 - a. Finish coats for ferrous metal and galvanized steel; two coats.
 - 1) Benjamin Moore; Ultra Spec HP DTM Acrylic Semi-Gloss, WH29; DFT 2.3 mils.
 - 2) PPG; Pitt-Tech Plus Int./Ext. Semi-Gloss DTM Industrial Enamel, 90-1210 Series; DFT 2.0 mils.
 - 3) Sherwin Williams; Pro Industrial DTM Acrylic Semi-Gloss, B66W01100 Series; DFT 2.5 mils.

2.04 INTERIOR PAINTS

- A. General:
 1. For the following locations, provide the paint sheen indicated, unless otherwise indicated on Drawings:
 - a. Ceilings, Soffits and Ceiling Drops: Flat sheen.
 - b. Gypsum Board, except at Ceilings: Eggshell sheen.
 - c. Wood: Semigloss sheen.
 - d. Masonry: Semigloss sheen.
 - e. Metals: Semigloss sheen
- B. Interior Paint Systems - Latex.
 1. Primers: For all sheens unless otherwise indicated.
 - a. Primer for concrete masonry units; one coat.

- 1) Benjamin Moore; Super Spec Masonry Interior/Exterior Hi-Build Block Filler, 206; DFT 9.0 mils.
- 2) PPG; Speedhide Interior/Exterior Masonry Hi Fill Latex Block Filler, 6-15; DFT 7.0 mils.
- 3) Sherwin Williams; PrepRite Interior/Exterior Latex Block Filler, B25W25; DFT 8.0 mils.
- b. Severe Duty Two Component Epoxy Block Filler: Epoxy block filler used for filling open textured interior concrete block, before the application of high performance top coats. This filler should be used in all high moisture areas such as kitchens, showers, as well as all partitions at classrooms and quiet rooms.
 - 1) Devoe Tru-Glaze 4015 H P water borne 4015-1000
 - 2) O'Leary Paints: 138-111-138-251B Acrylic Epoxy Block Filler
 - 3) Sherwin-Williams Company (The): B42-WA8 WA9 or W42200/B42V201-Cement Plex
 - 4) Benjamin Moore & Co.: M31/M32 Acrylic Epoxy Block Filler
 - 5) PPG: Amerlock 400 BF Two-component epoxy masonry block filler
- c. Primer for ferrous metal and galvanized steel; one coat.
 - 1) Benjamin Moore; Super Spec HP Acrylic Metal Primer, P04; DFT 2.0 mils.
 - 2) PPG; Pitt-Tech Plus Int./Ext. DTM Industrial Primer, 90-912 Series; DFT 3.0 mils.
 - 3) Sherwin Williams; Pro Industrial Pro-Cryl Universal Primer, B66W310 Series; DFT 3.0 mils.
- d. Primer for gypsum board; one coat.
 - 1) Benjamin Moore; Fresh Start Natura Zero VOC Primer, 511; DFT 1.2 mils.
 - 2) PPG; Pure Performance Interior Latex Primer - 9-900; DFT 1.4 mils.
 - 3) Sherwin Williams; ProMar 200 Zero VOC Interior Latex Primer, B28W02600; DFT 1.0 mils.
- e. Primer for previously painted surfaces; one coat.
 - 1) Benjamin Moore; Fresh Start High-Hiding All Purpose Primer, 046; DFT 1.4 mils.
 - 2) PPG; Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer, 17-921 Series; DFT 1.6 mils.
 - 3) Sherwin Williams; PrepRite ProBlock Interior/Exterior Latex Primer/Sealer, B51-600 Series; DFT 1.4 mils.
- f. Primer for structural glazed facing tile and hard tile; one coat.
 - 1) Benjamin Moore; Fresh Start High-Hiding All Purpose Primer, 046; DFT 1.4 mils.
 - 2) PPG; Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer, 17-921 Series; DFT 1.6 mils.
 - 3) Sherwin Williams; PrepRite ProBlock Interior/Exterior Latex Primer/Sealer, B51-600 Series; DFT 1.4 mils.
- g. Primer for insulated piping and insulated ductwork; one coat.
 - 1) Benjamin Moore; Fresh Start High-Hiding All Purpose Primer, 046; DFT 1.4 mils.
 - 2) PPG; Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer, 17-921 Series; DFT 1.6 mils.
 - 3) Sherwin Williams; PrepRite ProBlock Interior/Exterior Latex Primer/Sealer, B51-600 Series; DFT 1.4 mils.
2. Semigloss Sheen:
 - a. Finish coats for all surfaces except metals; two coats.
 - 1) Benjamin Moore; Ultra Spec 500 Interior Semi-gloss Finish, N539; DFT 1.8 mils.
 - 2) PPG; Speedhide Zero Interior Zero-VOC Latex Semi-Gloss, 6-4500 Series; DFT 1.3 mils.
 - 3) Sherwin Williams; ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series; DFT 1.6 mils.
 - b. Finish coats for ferrous metal and galvanized steel; two coats.
 - 1) Benjamin Moore; Ultra Spec HP DTM Acrylic Semi-Gloss, WH29; DFT 2.3 mils.

- 2) PPG; Pitt-Tech Plus Int./Ext. Semi-Gloss DTM Industrial Enamel, 90-1210 Series; DFT 2.0 mils.
- 3) Sherwin Williams; Pro Industrial DTM Acrylic Semi-Gloss, B66W01150 Series; DFT 2.5 mils.
3. Eggshell Sheen:
 - a. Finish coats for all surfaces; two coats.
 - 1) Benjamin Moore; Ultra Spec 500 Interior Eggshell Finish, N538; DFT 1.8 mils.
 - 2) PPG; Speedhide Zero Interior Zero-VOC Latex Eggshell, 6-4300 Series; DFT 1.5 mils.
 - 3) Sherwin Williams; ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-2600 Series; DFT 1.7 mils.
4. Flat Sheen:
 - a. Finish coats for all surfaces; two coats.
 - 1) Benjamin Moore; Ultra Spec 500 Interior Flat Finish, N536; DFT 1.8 mils.
 - 2) PPG; Speedhide Zero Interior Zero-VOC Latex Flat, 6-4100 Series; DFT 1.4 mils.
 - 3) Sherwin Williams; ProMar 200 Zero VOC Interior Latex Flat, B30-2600 Series; DFT 1.6 mils.

2.05 DRYFALL PAINTS

A. General:

1. Provide dryfall paint at exposed ceiling construction, unless otherwise indicated

B. Interior Dryfall Systems - Waterborne.

1. Flat Sheen:

- a. Undercoat; one coat. Unless otherwise recommended by the dryfall manufacturer, prime substrates with one of the following products:
 - 1) Benjamin Moore; Latex Dry Fall Flat, 395; DFT 1.9 mils
 - 2) PPG; SEAL GRIP Interior/Exterior Acrylic Universal Primer/Sealer, 17-921; DFT 1.6 mils
 - 3) Sherwin Williams; Pro Industrial Waterborne Acrylic Dryfall Flat, B42 Series; DFT 2.0 mils
- b. Finish coat; one coat.
 - 1) Benjamin Moore; Latex Dry Fall Flat, 395; DFT 1.9 mils.
 - 2) PPG; Speedhide Interior Dry-Fog Flat, 6-715XI; DFT 2.0 mils.
 - 3) Sherwin Williams; Pro Industrial Waterborne Acrylic Dryfall Flat, B42 Series; DFT 2.0 mils.

2.06 SEALERS

A. General:

1. Provide sealer at concrete masonry units, unless otherwise indicated.

2.07 CONCRETE STAINS

A. General:

1. Locations:

- a. Use at following locations: Unless otherwise indicated, unfinished exposed concrete floors, equipment pads, ramps, steps, and stairs are to be finished using concrete stains.

B. Concrete Stains:

1. For traffic surfaces:

- a. Water-based, film-forming, solid color, acrylic concrete stain; two coats.
 - 1) Benjamin Moore; Insl-X Tuffcrete WB Acrylic Waterproofing Concrete Stain, CST-2XXX; DFT 1.0 mils
 - 2) H&C: H&C Colortop Water-Based Solid Color Concrete Stain; DFT As recommended by manufacturer.
 - 3) PPG; Perma-Crete Color Seal WB Interior/Exterior Concrete Stain, 4-4210XI Series; DFT 1.5 mils.

2.08 ACCESSORY MATERIALS

- A. Accessory Materials: Provide sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

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 product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials; report incompatible primer conditions and submit recommended changes for Architect's approval.
 - 1. Do not proceed with remedial action or change without receiving written authorization from Architect.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below following maximums:
 - 1. Interior Materials:
 - a. Gypsum Wallboard: 12 percent.
 - b. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 2. Report unacceptable conditions and submit recommended remedial action for Architect's approval.
 - a. Do not proceed with remedial action or change without receiving written authorization from Architect.

3.02 PREPARATION

- A. General:
 - 1. Clean surfaces thoroughly and correct defects prior to application.
 - 2. Prepare surfaces using the methods recommended by the top coat manufacturer for achieving the best result for the substrate under the project conditions.
 - 3. Remove or repair existing paints or finishes that exhibit surface defects.
 - 4. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
 - a. After work is completed, reinstall removed items.
 - 5. Seal surfaces that might cause bleed through or staining of topcoat.
 - 6. Remove mildew from impervious surfaces by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- B. Concrete - Non-Traffic Surfaces:
 - 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. Clean concrete according to ASTM D4258. Allow to dry.
- C. Masonry:
 - 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.
- D. Gypsum Board:
 - 1. Interior:
 - a. Fill minor defects with filler compound; make smooth and flush with adjacent surfaces.
 - b. Spot prime defects after repair.
- E. Ferrous Metal - Non-galvanized:

1. Solvent clean according to SSPC-SP 1.
 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
 - a. Re-prime entire shop-primed item.
 3. 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.
- F. Galvanized Surfaces:
1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 2. Remove loose paint and other debris according to SSPC-SP 2.
- G. Previously Painted Existing Surfaces:
1. Remove all loose paint, dust, dirt, mold, mildew, oil, grease, rust, loose mill scale, mortar, and any other surface contamination.
 2. Scrape all loose, blistered, peeling, scratched or otherwise imperfect paint down to bare substrate and sand adjacent tightly adhering paint to feather edge.
 - a. Tightly adhered existing paint may remain.
 3. Spot prime all bare areas with appropriate primer before re-priming entire surface.
- H. Structural Glazed Facing Tile and Hard Tile Surfaces:
1. Remove all dust, dirt, mold, mildew, oil, grease, mortar, and any other surface contamination.
 2. Mechanically abrade surface to achieve a surface profile as recommended by the paint manufacturer.

3.03 APPLICATION - PAINT PRODUCTS

- A. Apply products in accordance with manufacturer's written instructions.
- B. Provide smooth, opaque coatings of uniform finish, color, appearance, and coverage without brush marks, runs, sags, laps, ropiness, holidays, spotting, cloudiness, or other surface imperfections.
- C. Terminate paint in neat lines.
- D. Apply paint products to properly prepared surfaces.
 1. Do not apply coatings over dirt, rust, scale, grease, moisture, or other conditions detrimental to application of coatings
- E. Primers:
 1. Apply first coat of primer to surfaces as soon as practical after preparation and before subsequent surface deterioration.
 2. Re-prime shop-primed surfaces.
- F. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
 1. Sand between coats as recommended by manufacturer; before applying next coat vacuum clean surfaces of loose particles and use tack cloth to remove any remaining dust and particles just prior to applying next coat.
- G. Provide completed work matching approved samples for color, sheen, texture, coverage and quality of work.
 1. Remove, refinish, or repaint work not complying with requirements.
- H. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- I. Use applicators and methods best suited for substrate and type of material being applied and according to manufacturer's instructions.
 1. Brush Application: Use brushes best suited for type of material applied; use brush of appropriate size for surface or item being painted; produce results free of visible brush marks.

2. Roller Application: Use rollers of fiber type and nap length as recommended by manufacturer for material and texture required.
3. Spray Application: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- J. Number of Coats: Each paint system specifies a number of coats. This is the minimum number required.
 1. If undercoats, stains, or other imperfections are visible after final coat of paint, apply additional coats until paint is of uniform finish, color, and appearance without defects or imperfections.
- K. Minimum Coating Thickness: Provide dry film thickness for each coat as indicated, but not less than that recommended by the coating manufacturer.
 1. Number of coats and film thicknesses required are same regardless of application method.
 2. Ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.

3.04 APPLICATION - DRYFALL PAINTS

- A. Apply products in accordance with manufacturer's written instructions.
- B. Dryfall overspray may adhere to hot surfaces; protect hot equipment and surfaces not intended to be painted from overspray.
- C. Do not apply succeeding coats until previous coat has dried completely as recommended by manufacturer.
- D. Provide even uniform coatings without runs, sags, laps, holidays, spotting, cloudiness, or other imperfections.

3.05 APPLICATION - CONCRETE STAINS

- A. Apply products in accordance with manufacturer's written instructions.
- B. Provide even uniform coatings without brush marks, runs, sags, laps, holidays, spotting, cloudiness, or other imperfections.

3.06 SURFACES TO BE PAINTED

- A. General: Paint all exposed surfaces except where indicated not to be painted or to remain natural.
 1. The term "exposed" includes areas visible through permanent and built-in fixtures when they are in place.
 2. If surface, material, or item is not specifically mentioned, paint in same manner, color, and sheen as similar surfaces, materials, or items, regardless of whether indicated or not.
 3. Paint surfaces that are cut and patched to permit installation of electrical services, piping, and ductwork.
- B. Equipment and Furniture:
 1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces.
 2. Paint surfaces to be concealed behind permanently installed fixtures, equipment, and furnishings, using primer only, prior to installation of permanent item.
- C. Registers and Grilles: Paint interior surfaces of ducts, for a minimum of 18 inches or beyond sight line, whichever is greater, with a flat black (non-reflecting) paint.
- D. Access Panels: Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
- E. Doors:
 1. Exterior Doors: Finish doors on tops, bottoms, and all four edges the same as exterior faces.
 2. Interior Doors: Finish doors on tops, bottoms, and all four edges the same as face of non-secured side.

- F. Panelboards for Service Panels, Telephone and Other Electrical Equipment:
 - 1. Paint both sides and all edges of plywood before installation.
 - a. Color and Sheen: Gray, semi-gloss, unless otherwise indicated.
- G. Mechanical and Electrical:
 - 1. This Section includes painting of all mechanical, fire protection, and electrical items.
 - a. Do not paint sprinkler heads and polished fire protection components.
 - b. Do not paint insulated pipe, duct work or equipment before insulation is applied.
 - 2. Piping, Insulated Piping, Pipe Hangers, and Supports:
 - a. In finished/public areas, paint exposed piping the same color and sheen as surface it is mounted on unless otherwise indicated.
 - b. In utility areas, paint exposed piping according to piping color coding scheme; otherwise paint the same color and sheen as surface it is mounted on unless otherwise indicated.
 - c. Paint all exposed pipe hangers and supports the same color and sheen as surface it is mounted on unless otherwise indicated.
 - 1) Any portion of hangers and supports encompassing the actual pipe shall be painted to match the pipe color and sheen.
 - 3. Ductwork, Insulated Ducts, and Supports:
 - a. In finished/public areas, paint exposed ductwork and supports the same color and sheen as surface it is mounted on unless otherwise indicated.
 - b. In utility areas, paint exposed ductwork according to color coding scheme; otherwise paint the same color and sheen as surface it is mounted on unless otherwise indicated.
 - c. Paint all exposed hangers and supports the same color and sheen as surface it is mounted on unless otherwise indicated.
 - 1) Any portion of hangers and supports encompassing the actual ductwork shall be painted to match the ductwork color and sheen.
 - 4. Electrical Conduit, Fittings and Junction Boxes:
 - a. In finished/public areas, paint exposed conduit, fittings and junction boxes same color and sheen as surface it is mounted on unless otherwise indicated.
 - b. In utility areas, paint exposed conduit, fittings and junction boxes according to color coding scheme; otherwise paint the same color and sheen as surface it is mounted on unless otherwise indicated.
 - 5. Mechanical and Electrical Equipment:
 - a. Exterior Equipment: Paint all equipment exposed to the weather.
 - 1) Do not paint factory-finished equipment unless otherwise indicated.
 - b. Paint shop-primed mechanical and electrical equipment same color and sheen as surface it is mounted on unless otherwise indicated.
 - c. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - d. Paint interior surfaces of convector and baseboard heating cabinets to match face panels.

3.07 SURFACES NOT TO BE PAINTED

- A. Do not paint or finish the following unless otherwise indicated:
 - 1. Factory-finished items; factory-primed items are not considered factory-finished.
 - 2. Items indicated to receive other finish.
 - 3. Items indicated to remain naturally finished.
 - 4. Fire rating labels.
 - 5. Equipment serial number and capacity labels.
 - 6. Operating parts of equipment.
 - 7. Aluminum components.
 - 8. Polished and brushed stainless steel items.
 - 9. Metal flashings.

10. Brick.
11. Cast-in-place concrete.
12. Surfaces concealed by suspended ceilings.
13. Concealed piping, ductwork, and conduit.
14. Surfaces within pipe and duct spaces.
15. Acoustical materials.

3.08 IDENTIFICATION AND COLOR CODING

A. Partition Identification.

1. Permanently label each partition required to have protected openings, such as fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions.
 - a. Labeling:
 - 1) Labeling may be either painted stencils or premanufactured self-adhesive stickers.
 - 2) Lettering not less than 3 inches in height, minimum 3/8 inch stroke width, in contrasting color. Suggested wording as follows:
 - (a) "2 HOUR FIRE BARRIER - PROTECT ALL OPENINGS" or similar.
 - 3) Colors and exact wording of labels shall comply with local code(s).
 - b. Locations:
 - 1) Where possible, locate labels in accessible concealed floor, floor-ceiling, and attic spaces.
 - 2) Locate labels within 15 feet of the ends of each wall and intervals not to exceed 30 feet measured horizontally along the wall. Minimum of one label per run of wall.
 - (a) Locate 6 inches above accessible ceiling or 6 inches below ceiling/roof in exposed construction unless otherwise required by local code(s).
 - 3) Where multiple construction types occur in single run of wall:
 - (a) At accessible ceilings, paint 2 inch wide vertical line full height above ceiling to note changes in wall construction, label area between the line as indicated.
 - (b) At exposed construction, paint 2 inch wide vertical line 2 inches beyond top and bottom of lettering and label area between the line as indicated.

B. Mechanical and Electrical Identification and Color Coding :

1. Refer to Divisions 21, 22, 23, and 26 for color coding scheme and identification of mechanical and electrical services; if no identification is provided, paint as follows:
 - a. Color Coding Scheme and Identification:
 - 1) Piping: None; paint to match surface on which it is mounted.
 - 2) Ductwork: None; paint to match surface on which it is mounted.
 - 3) Conduit: None; paint to match surface on which it is mounted.

3.09 FIELD QUALITY CONTROL

A. Owner may provide field inspection.

B. All painted surfaces shall be inspected as follows:

1. Paint shall be rejected for the following:
 - a. Lacking minimum dry film thicknesses.
 - 1) Inspector may test for proper dry film thickness using methods as recommended by the inspector.
 - b. Poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, and corners.
 - c. Damage from touching, or disturbing paint in any other manner, before sufficiently dry.
 - d. Damage from application to moist surfaces or damage caused by inadequate protection from the weather.
 - e. Damage or contamination of paint from blown contaminants including but not limited to dust.

2. Paint shall be rejected if any of the following are evident under natural lighting for exterior surfaces and final lighting source, including daylighting, for interior surfaces:
 - a. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 48 inches.
 - b. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 48 inches.
 - c. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles from a distance of not less than 48 inches.
 - C. Visible defects are defined as follows:
 1. Brush and 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. When the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.
 - D. Paint rejected by the inspection shall be repaired or replaced at the expense of the Contractor.
 1. Small affected areas shall be touched up.
 2. Large affected areas shall be repainted.
 3. Small and large areas shall be as defined by the Architect.
 4. Areas without sufficient dry film thickness shall be repainted.
 5. Paint runs and sags shall be removed by scraper or sanding and repainted.
- 3.10 CLEANING**
- A. At end of each workday, remove empty cans, rags, and other discarded paint materials from site.
 1. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.
- 3.11 PROTECTION**
- A. Protect other work, whether being painted or not, against damage from painting activities.
 1. Correct damage by cleaning, repairing, replacing as approved by Architect
 - B. Protect finishes until completion of project.
 - C. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 09 9600 - HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior epoxy paints - non-traffic surfaces.
- B. High performance coatings for structural steel, steel joists, and metal decking, including exposed steel lintels.
- C. High performance coatings in natatorium/pool environments.

1.02 RELATED REQUIREMENTS

- A. Section 09 9100 - Painting.

1.03 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section
- B. DFT: Dry film thickness, measured in mils.
- C. WFT : Wet film thickness, measured in mils.

1.04 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. ASTM D1653 - Standard Test Methods for Water Vapor Transmission of Organic Coating Films; 2013.
- D. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2012).
- E. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.
- F. ASTM D523 - Standard Test Method for Specular Gloss; 2014.
- G. ASTM E96/E96M - Standard Test Methods of Water Vapor Transmission of Materials - 2016
- H. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; California Department of Public Health; v1.1, 2010.
- I. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
- J. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.
- K. SSPC-SP 1 - Solvent Cleaning; 2015.
- L. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- M. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.05 SUBMITTALS

- A. Refer to Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product data for each coating product. Include complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category.
 - a. Example of general product categories:
 - 1) Two component, waterbased, acrylic epoxy - Gloss Sheen.
 - 2) Interior primer for concrete masonry units.
 - 2. For each high-performance coating system and substrate, indicate which products are to be used.
 - a. Examples:
 - 1) Interior Waterborne Acrylic Epoxy Paint for Concrete Masonry Units:

- (a) Primer: Name of specific product provided.
- (b) Finish Coats: Name of specific product provided.
- 2) Interior High Performance Coating For Structural Steel.
 - (a) Primer: Name of specific product provided.
 - (b) Intermediate Coat: Name of specific product provided.
 - (c) Top Coat: Name of specific product provided.
- b. Use same designations indicated on Drawings and Schedules.
- C. Samples: Submit 3 samples, 8-1/2 by 11 inches in size, illustrating each color and sheen specified.
 - 1. High-performance coating color submittals will not be considered until color submittals for major materials not to be painted, such as masonry and storefront finishes, have been approved.
- D. Manufacturer's Qualification Statement.
- E. Installer's Qualification Statement.
- F. 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, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Materials: 1 gallon of each color, sheen, and type; from the same product run.
 - 3. Label each container with color, type, and finish in addition to the manufacturer's label.
- H. Field Quality Control Reports.

1.06 **QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum 5 years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years documented experience.

1.07 **MOCK-UPS**

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Mock-ups shall demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.
- C. Provide a mock-up for each high-performance coating system, substrate, color and sheen as follows:
 - 1. Vertical and Horizontal Surfaces: Provide mockup samples of at least 100 sq. ft.
 - 2. Doors and Frames: Provide mock-up samples of one complete door and frame.
 - 3. Railings and Other Lineal Materials: Provide mock-up samples of at least 8 lineal feet.
- D. Locate where directed by Architect.
- E. Mock-ups may remain as part of work.

1.08 **DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Coating Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 FIELD CONDITIONS

- A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.
- C. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.
- D. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide high-performance coating products from same manufacturer, unless otherwise specified. For each high performance coating system, provide one of the indicated products for each coating within the system.
 - 1. Exceptions shall be permitted, provided approval of Architect is obtained using specified procedures for substitutions.
- B. High Performance Coating Manufacturers.
 - 1. Benjamin Moore: Benjamin Moore & Co.: [www:benjaminmoore.com](http://www.benjaminmoore.com).
 - 2. PPG: PPG Industries, Inc., Architectural Coatings: www.ppgpaints.com.
 - 3. Sherwin-Williams: The Sherwin-Williams Company: www.sherwin-williams.com.
 - 4. Tnemec: Tnemec Company Inc.: www.tnemec.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 HIGH-PERFORMANCE COATINGS - GENERAL

- A. Provide epoxy paints and high performance coatings where indicated on Drawings; otherwise provide paints as specified in Section 09 9100 - Painting.
- B. Natatoriums:
 - 1. Provide epoxy paints and high performance coatings at natatorium/pool environments. This includes, but is not limited to, the following locations and substrates:
 - a. Exposed Structural steel, steel joists, and metal decking.
 - b. Concrete masonry units.
 - c. Concrete where indicated on Drawings.
 - d. Miscellaneous non-structural, ferrous metal and galvanized steel.
 - e. Aluminum where indicated on Drawings.
- C. 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.
- D. Supply each coating material in quantity required to complete entire project's work from a single production run.
- E. Do not reduce, thin, or dilute coatings or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- F. Volatile Organic Compound (VOC) Content and Emissions:
 - 1. Volatile Organic Compound (VOC) Content:
 - a. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - 1) 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2) Architectural coatings VOC limits of State in which the project is located.
 - 2. 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.
- G. Sheen/Gloss Criteria.

1. Product names are not acceptable as gloss level identification.
2. Determine gloss value of paint finish by testing paint samples according to ASTM D523, using 60 degree geometry. Sheen/Gloss levels shall be defined as follows:
 - a. Gloss Level 1: Flat/Matte, value between 0 and 5 units.
 - b. Gloss Level 2: Velvet, value between 5 and 10 units.
 - c. Gloss Level 3: Eggshell, value between 10 and 20 units.
 - d. Gloss Level 4: Satin, value between 20 and 35 units.
 - e. Gloss Level 5: Semigloss, value between 35 and 70 units.
 - f. Gloss Level 6: Gloss, value between 70 and 85 units.
 - g. Gloss Level 7: High Gloss, value more than 85 units.
3. Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

H. Colors: To match Architect's samples unless indicated otherwise on Drawings

2.03 INTERIOR EPOXY PAINTS - NON-TRAFFIC SURFACES

A. Waterborne Acrylic Epoxy Paint - Non-Traffic Systems.

1. Primers: For all sheens unless otherwise indicated.
 - a. Primer for concrete; one coat.
 - 1) Benjamin Moore:
 - (a) Semigloss and Eggshell Sheens: INSL-X Aqua Lock Plus 100 pct Acrylic Primer Sealer, AQ-0XXX; DFT 1.6 mils.
 - 2) PPG; Perma-Crete Interior/Exterior Alkali Resistant Primer, 4-603; DFT 1.5 mils.
 - 3) Sherwin Williams; Loxon Concrete and Masonry Prime/Sealer Interior/Exterior Latex, A24W8300 Series; DFT 2.5 mils.
 - b. Primer for concrete masonry units; one coat.
 - 1) Benjamin Moore; Super Spec Masonry Interior/Exterior Hi-Build Block Filler, 206; DFT 9.0 mils.
 - 2) PPG; Speedhide Interior/Exterior Masonry Hi Fill Latex Block Filler, 6-15; DFT 7.0 mils.
 - 3) Sherwin Williams:
 - (a) Semigloss and Eggshell Sheens: Loxon Block Surfacer A24W00200; DFT 2.5 mils.
 - c. Primer for ferrous metal and galvanized steel; one coat.
 - 1) Benjamin Moore; Corotech Acrylic Metal Primer, V110; DFT 2.0 mils.
 - 2) PPG; Pitt-Tech Int./Ext. DTM Industrial Primer, 90-712 Series; DFT 3.0 mils.
 - 3) Sherwin Williams; Pro Industrial Pro-Cryl Universal Primer, B66W310 Series; DFT 3.0 mils.
 - d. Primer for gypsum board; one coat.
 - 1) Benjamin Moore; Fresh Start Natura Zero VOC Primer, 511; DFT 1.2 mils.
 - 2) PPG; Pure Performance Interior Latex Primer - 9-900; DFT 1.4 mils.
 - 3) Sherwin Williams; ProMar 200 Zero VOC Interior Latex Primer, B28W02600; DFT 1.0 mils.
 - e. Primer for previously painted surfaces; one coat.
 - 1) Benjamin Moore; Fresh Start High-Hiding All Purpose Primer, 046; DFT 1.4 mils.
 - 2) PPG; Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer, 17-921 Series; DFT 1.6 mils.
 - 3) Sherwin Williams; PrepRite ProBlock Interior/Exterior Latex Primer/Sealer, B51-600 Series; DFT 1.4 mils.
 - f. Primer for insulated piping and insulated ductwork; one coat.
 - 1) Benjamin Moore; Fresh Start High-Hiding All Purpose Primer, 046; DFT 1.4 mils.
 - 2) PPG; Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer, 17-921 Series; DFT 1.6 mils.
 - 3) Sherwin Williams; PrepRite ProBlock Interior/Exterior Latex Primer/Sealer, B51-600 Series; DFT 1.4 mils.
2. Semigloss Sheen: One component, pre-catalyzed, waterbased, acrylic epoxy.

- a. Finish coats for all surfaces; two coats.
 - 1) Benjamin Moore; Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss, V341; DFT 1.5 mils
 - 2) PPG; Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-510 Series; DFT 2.0 mils.
 - 3) Sherwin Williams; Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-150 Series, Semi-Gloss; DFT 1.5 mils.

2.04 HIGH PERFORMANCE COATINGS IN NATATORIUMS

- A. Structural steel, steel joists, and metal decking, including exposed steel lintels:
 1. Refer to "High Performance Coatings For Structural Steel, Metal Decking, and Steel Joists" Article above.
- B. Concrete Masonry Units and Concrete:
 1. Primer:
 - a. Primer for concrete masonry units; one coat.
 - 1) Benjamin Moore; Corotech, Waterborne Epoxy Block Filler, V163; DFT 10.0 mils.
 - 2) PPG; Cementitious Waterproofing Block Filler, 95-217; DFT 12.5 mils.
 - 3) Sherwin Williams: Protective and Marine Coatings, Kem Cati-Coat HS Epoxy Filler/Sealer, B42 Series; DFT 15.0 mils.
 - 4) Tnemec; Envriofill Series 130; Coverage rate 70 sq. ft. per gallon.
 - b. Primer for concrete; one coat.
 - 1) Benjamin Moore: Corotech 100 pct Solids Epoxy Pre-Primer V155; DFT 2.5 mils.
 - 2) PPG; Aquapon 35, 95-1000 Series; DFT 4.0 mils.
 - 3) Sherwin Williams; Pro Industrial High Performance Epoxy, B67 Series; DFT 6.0 mils.
 - 4) Tnemec; Surfacing Epoxy, Series 215; DFT 3.0 mils.
 - c. Primer for previously painted surfaces; one coat.
 - 1) Benjamin Moore: Corotech 100 pct Solids Epoxy Pre-Primer V155; DFT 2.5 mils.
 - 2) PPG; Aquapon 35, 95-1000 Series; DFT 4.0 mils.
 - 3) Sherwin Williams; Pro Industrial High Performance Epoxy, B67 Series; DFT 6.0 mils.
 - 4) Tnemec; Surfacing Epoxy, Series 215; DFT 3.0 mils.
 2. Intermediate Coat; one coat.
 - a. Benjamin Moore; Corotech Surface Tolerant Epoxy Mastic Coating, V160; DFT 6.0 mils.
 - b. PPG; Aquapon 97-130 Series; DFT 5.0 mils.
 - c. Sherwin Williams; Protective and Marine Coatings Macropoxy 646 Fast Cure Epoxy; DFT 7.5 mils.
 - d. Tnemec; Hi-Build Epoxoline II Series L69; DFT 5.0 mils.
 3. Top Coat; one coat.
 - a. Benjamin Moore; Corotech Aliphatic Acrylic Urethane Semi-Gloss, V510; DFT 2.5 mils.
 - b. PPG; Pitthane 95-8800 Series; DFT 4.0 mils.
 - c. Sherwin Williams; Protective and Marine Coatings Acrolon 218 HS Acrylic Polyurethane, Semi-gloss; DFT 5.0 mils.
 - d. Tnemec; Enviro-Glaze Series 297; DFT 3.0 mils.
- C. Miscellaneous Non-Structural, Ferrous Metal and Galvanized Steel:
 1. Primers:
 - a. Zinc-rich primer.
 - 1) Locations:
 - (a) Galvanized steel.

- (b) Other areas as indicated.
- 2) Primer:
 - (a) Benjamin Moore; Corotech Organic Zinc Rich Primer, V170; DFT 2.0 mils.
 - (b) PPG; Aquapon 97-670 Series; DFT 4.0 mils.
 - (c) Sherwin Williams; Protective and Marine Coatings Zinc Clad IV (85) Organic Zinc Rich Coating; DFT 4.0 mils.
 - (d) Tnemec; Tneme-Zinc Series 90-97; DFT 3.0 mils.
- b. Epoxy Primer; one coat.
 - 1) Locations:
 - (a) Where zinc-rich primer is not required.
 - 2) Primer:
 - (a) Benjamin Moore: Corotech Polyamide Epoxy Primer V150; DFT 2.5 mils.
 - (b) PPG; Multiprime EFD Epoxy Fast Dry Inhibitive Primer, 94-109 Series; DFT 5.0 mils.
 - (c) Sherwin Williams; Protective and Marine Coatings Macropoxy 5000 Penetrating Epoxy Primer/Sealer, B58 Series; DFT 1.5 mils.
 - (d) Tnemec; Hi-Build Epoxoline Series 66; DFT 4.0 mils..
- c. Primer for previously painted surfaces: one coat.
 - 1) Benjamin Moore: Corotech Polyamide Epoxy Primer V150; DFT 2.5 mils.
 - 2) PPG; Multiprime EFD Epoxy Fast Dry Inhibitive Primer, 94-109 Series; DFT 5.0 mils.
 - 3) Sherwin Williams; Protective and Marine Coatings Macropoxy 5000 Penetrating Epoxy Primer/Sealer, B58 Series; DFT 1.5 mils.
 - 4) Tnemec; Hi-Build Epoxoline Series 66; DFT 4.0 mils..
- 2. Intermediate Coat; one coat.
 - a. Benjamin Moore; Corotech Surface Tolerant Epoxy Mastic Coating, V160; DFT 6.0 mils.
 - b. PPG; Aquapon 97-130 Series; DFT 5.0 mils.
 - c. Sherwin Williams; Protective and Marine Coatings Macropoxy 646 Fast Cure Epoxy; DFT 7.5 mils.
 - d. Tnemec; F.C. Typoxy Series 27; DFT 5.0 mils.
- 3. Top Coat; one coat.
 - a. Benjamin Moore; Corotech Aliphatic Acrylic Urethane Semi-Gloss, V510; DFT 2.5 mils.
 - b. PPG; Pitthane 95-8800 Series; DFT 4.0 mils.
 - c. Sherwin Williams; Protective and Marine Coatings Acrolon 218 HS Acrylic Polyurethane, Semi-gloss; DFT 5.0 mils.
 - d. Tnemec; Endura-Shield Series 73; DFT 4.0 mils..

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of high-performance coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of high performance coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials; report incompatible primer conditions and submit recommended changes for Architect's approval.
 - 1. Do not proceed with remedial action or change without receiving written authorization from Architect.

- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below following maximums:
 - 1. Interior Materials:
 - a. Gypsum Wallboard: 12 percent.
 - b. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 2. Report unacceptable conditions and submit recommended remedial action for Architect's approval.
 - a. Do not proceed with remedial action or change without receiving written authorization from Architect.

3.02 PREPARATION

- A. General:
 - 1. Clean surfaces thoroughly and correct defects prior to application.
 - 2. Prepare surfaces using the methods recommended by the top coat manufacturer for achieving the best result for the substrate under the project conditions.
 - 3. Remove or repair existing paints or finishes that exhibit surface defects.
 - 4. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
 - a. After work is completed, reinstall removed items.
 - 5. Seal surfaces that might cause bleed through or staining of topcoat.
 - 6. Remove mildew from impervious surfaces by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- B. Concrete - Non-Traffic Surfaces:
 - 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. Clean concrete according to ASTM D4258. Allow to dry.
- C. Masonry:
 - 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.
- D. Gypsum Board:
 - 1. Interior:
 - a. Fill minor defects with filler compound; make smooth and flush with adjacent surfaces.
 - b. Spot prime defects after repair.
- E. Ferrous Metal - Non-galvanized:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
 - a. Re-prime entire shop-primed item.
 - 3. 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.
- F. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Remove loose paint and other debris according to SSPC-SP 2.
- G. Previously Painted Existing Surfaces:
 - 1. Remove all loose paint, dust, dirt, mold, mildew, oil, grease, rust, loose mill scale, mortar, and any other surface contamination.
 - 2. Scrape all loose, blistered, peeling, scratched or otherwise imperfect paint down to bare substrate and sand adjacent tightly adhering paint to feather edge.

- a. Tightly adhered existing paint may remain unless primer manufacturer recommends removal.
 3. Test for proper primer adhesion, as defined by the primer manufacturer, prior to proceeding with application of high performance coatings.
 - a. Notify Architect of improper adhesion results; do not proceed with work until additional instructions are received from Architect.
 4. Spot prime all bare areas with appropriate primer before re-priming entire surface.
- 3.03 APPLICATION - HIGH PERFORMANCE COATINGS**
- A. Apply products in accordance with manufacturer's written instructions.
 - B. Provide smooth, opaque coatings of uniform finish, color, appearance, and coverage without brush marks, runs, sags, laps, ropiness, holidays, spotting, cloudiness, or other surface imperfections.
 - C. Terminate high performance coatings in neat lines.
 - D. Apply high performance coatings to properly prepared surfaces.
 1. Do not apply coatings over dirt, rust, scale, grease, moisture, or other conditions detrimental to application of coatings
 - E. Primers:
 1. Apply first coat of primer to surfaces as soon as practical after preparation and before subsequent surface deterioration.
 2. Re-prime shop-primed surfaces.
 - F. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
 - G. Provide completed work matching approved samples for color, sheen, texture, coverage and quality of work.
 1. Remove, refinish, or reapply work not complying with requirements.
 - H. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
 - I. Use applicators and methods best suited for substrate and type of material being applied and according to manufacturer's instructions.
 1. Brush Application: Use brushes best suited for type of material applied; use brush of appropriate size for surface or item being painted; produce results free of visible brush marks.
 2. Roller Application: Use rollers of fiber type and nap length as recommended by manufacturer for material and texture required.
 3. Spray Application: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
 - J. Number of Coats: Each high performance coatings system specifies a number of coats. This is the minimum number required.
 1. If undercoats, stains, or other imperfections are visible after final coat of high performance coatings is applied, apply additional coats until high performance coating is of uniform finish, color, and appearance without defects or imperfections.
 - K. Minimum Coating Thickness: Provide dry film thickness for each coat as indicated, but not less than that recommended by the coating manufacturer.
 1. Number of coats and film thicknesses required are same regardless of application method.
 2. Ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.

3.04 SURFACES TO BE PAINTED

- A. Refer to Section 09 9100 - Painting.

3.05 SURFACES NOT TO BE PAINTED

- A. Refer to Section 09 9100 - Painting.

3.06 IDENTIFICATION AND COLOR CODING

- A. Refer to Section 09 9100 - Painting.

3.07 FIELD QUALITY CONTROL

- A. Owner may provide field inspection.
- B. All high performance coatings shall be inspected as follows:
 - 1. Coatings shall be rejected for the following:
 - a. Lacking minimum dry film thicknesses.
 - 1) Inspector may test for proper dry film thickness using methods as recommended by the inspector.
 - b. Poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, and corners.
 - c. Damage from touching, or disturbing paint in any other manner, before sufficiently dry.
 - d. Damage from application to moist surfaces or damage caused by inadequate protection from the weather.
 - e. Damage or contamination of paint from blown contaminants including but not limited to dust.
 - 2. Coatings shall be rejected if any of the following are evident under natural lighting for exterior surfaces and final lighting source, including daylighting, for interior surfaces:
 - a. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 48 inches.
 - b. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 48 inches.
 - c. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles from a distance of not less than 48 inches.
- C. Visible defects are defined as follows:
 - 1. Brush and 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. When the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.
- D. Coatings rejected by the inspection shall be repaired or replaced at the expense of the Contractor.
 - 1. Small affected areas shall be touched up.
 - 2. Large affected areas shall be repainted.
 - 3. Small and large areas shall be as defined by the Architect.
 - 4. Areas without sufficient dry film thickness shall be repainted.
 - 5. Paint runs and sags shall be removed by scraper or sanding and repainted.

3.08 CLEANING

- A. At end of each workday, remove empty cans, rags, and other discarded paint materials from site.
 - 1. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.09 PROTECTION

- A. Protect other work, whether being painted or not, against damage from high performance painting activities.
 - 1. Correct damage by cleaning, repairing, replacing as approved by Architect
- B. Protect finishes until completion of project.
- C. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

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SECTION 10 0100 - MISCELLANEOUS SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. High Security Key Lock Box (KNOXBox)
- B. Height Adjustable Monitor Wall Mounts.
- C. Seamless Safety Padding.
- D. Swimsuit Water Extractor.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the installation of products specified in this section with size, location and installation of service utilities.
 - 1. Verify size of Height Adjustable Monitor Wall Mounts with size of Monitor to be provided by Technology/Owner.
 - 2. Coordinate installation height of Height Adjustable Monitor Wall Mounts with Architect, Owner, and Technology Consultant.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, material descriptions, finishes, dimensions and details.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, and installation details.
 - 1. Include plans, elevations, sections, details, and attachments to other Work.
 - 2. Include wiring diagrams of electrical components as applicable.
- D. Samples of Seamless Safety Padding:
 - 1. Submit 3 samples of each finish, 4 by 4 inch in size, minimum; illustrating color, finish, and texture.
- E. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- F. Certificate: Certify that products of this section meet or exceed specified requirements.
- G. Test Reports: Show compliance to specified surface burning characteristics requirements.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Operation Data: Include normal operation, troubleshooting, and adjusting.
- K. Maintenance Data: Include data on regular cleaning.
- L. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package specified products as required to prevent damage before installation.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- B. Provide manufacturers' standard warranties for material and workmanship.
 - 1. Seamless Safety Padding: Protective Padding Contractor shall agree to repair or replace any defective material or work for a period of one (1) year from date of project substantial completion. This guarantee shall also include any loss of adhesion, resiliency or delaminating. This guarantee does not cover the damage caused by sharp or burning objects. This product is intended to supplement established management practices in order to provide a safe environment for the end user, owner, and client. Guarantee for this work shall be signed by both the Sub-Contractor and the Construction Manager.

PART 2 PRODUCTS

2.01 HIGH-SECURITY KEY LOCK BOX (KNOXBOX)

- A. KnoxBox surface/recessed mount with hinged door, with UL Listed Knox Tamper Alert. 0.25 inch plate steel housing, 0.5 inch thick steel door with interior gasket seal and stainless steel door hinge. Box is UL Listed. Lock has 0.125 inch thick stainless steel dust cover with tamper seal mounting capability, a rainguard to protect against certain weather conditions and a reflective Knox label indicating the Knox eLock System.
 - 1. Exterior Dimensions: Surface Mount Body - 4 inch High x 5 inch Wide x 3.875 inch Deep
Recessed Mount Flange - 7 inch High x 7 inch Wide.
 - 2. Electronic Lock: Powered by Knox eKey. Communicates using industry standard encryption.
 - 3. Finish: Knox-Coat proprietary finishing process.
 - 4. Color: Dark Bronze,
 - 5. P/N: KnoxBox KLS-3200 (manufacturer's cat. ID)
 - 6. Manufactured by: KNOX COMPANY
 - 7. Coordinate final mounting location and height with Scio Charter Township Fire Department.

2.02 HEIGHT ADJUSTABLE MONITOR WALL MOUNTS

- A. Products: Basis-of-Design: Balance Box Height Adjustable Mount; Manufactured by Newline Interactive: www.newline-interactive.com.
 - 1. Model: BalanceBox 650-130
 - 2. Substitutions: See Section 01 6000-Product Requirements.

2.03 SEAMLESS SAFETY PADDING

- A. General
 - 1. Basis-of-Design: Gold Medal Safety Padding as manufactured by Marathon Engineering Corporation: www.goldmedalsafetypadding.com. Protective padding material shall be a synthetic resinous material. Substitutions of a closed cell polyvinyl chloride or other types of polyvinyl chloride surfacing material will not be permitted.
 - a. Substitutions: See Section 01 6000-Product Requirements.
 - 2. All vertical panels shall be prefabricated. The panels are to be one (1) inch nominal thickness padded material bonded on Oriented Strand Board 7/16 inch thickness, making the wall panels a total of 1-1/2 inch thick.
 - 3. The door jambs shall be 1/2 inch thickness padding for a total of one (1) inch thickness on door jambs.
 - 4. All floor panels shall be prefabricated. The panels are to be 3/4 inch padded material bonded on Oriented Strand Board 7/16 inch thickness, for a nominal thickness of 1-1/4 inch (tolerance of +/- 1/8 inch).
- B. Properties
 - 1. In addition to meeting the minimum physical properties when cured, protective padding must contain a flame spread and smoke index which when tested in accordance with ASTM E84 is given a CLASS A FIRE RATING.
 - a. Flame Spread: 5
 - b. Smoke Development: less than or equal to 20

2. Padding to conform to the following:
 - a. Weight: Approximately 5 pounds per square foot.
 - b. Tensile Strength: Range 300 P.S.I. minimum ASTM D412 .
 - c. Temperature Stability: Unaffected from 20 degrees F to 120 degrees F.
 - d. Moisture Absorption: 0.8 percent to 1.05 percent by weight.
 - e. Compression properties: 30 PSI to 70 PSI at 50 percent modulus.
 - f. Elongation at break: ASTM D412 150 percent typical.
 - g. Critical radiant Flux of Floor Covering Systems: ASTM E648 less than 0.99 (W/cm²) (Class I).
 - h. Acute Oral Toxicity Test: Not Toxic.
 - i. Hardness: Durometer reading shall be 60 (plus or minus 5).
 - j. Fungus Resistance MIL-STD-810: Completely Resistant Rating (0.0.0).
3. Use manufacturers recommended fasteners for use in attachment of vertical panels.

2.04 SWIMSUIT WATER EXTRACTOR

- A. General:
 1. Basis-of-Design; Suitmate by Extractor Corporation: www.suitmate.com
- B. Technical Specifications:
 1. Power Rating: 115 V, 60 Hz, 8.6 Amp
 2. Dimensions: 15 inches x 15 inches x 23 inches
 3. Weight: 55 pounds
 4. Construction: 304-series stainless steel and durable plastic
 5. Spin Speed: 3450 RPM
 6. Motor: 1/3 horsepower
- C. Safety Features:
 1. Manual self-start and self-stop via hand pressure on the lid
 2. No exposed moving parts
 3. Built-in Ground Fault Circuit Interrupter (GFCI)
- D. Installation:
 1. Wall mounted
 2. Direct electrical connection to dedicated circuit
 3. Water drain to approved sanitary waste line

2.05 ACCESSORIES

- A. Mounting Hardware: Provide all related fasteners and hardware required for a complete installation at substrates indicated.
- B. Miscellaneous Trim and Accessories: Provide all trim and accessories required for a complete installation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as required by the specified products.
- C. Verify that electrical service requirements are correct and properly located for specified products.

3.02 INSTALLATION

- A. Install specified products in accordance with manufacturer's instructions.
- B. Install specified products in locations indicated.
- C. Install specified products level and plumb.
- D. Connect specified products to electrical service in accordance with manufacturer's instructions.

E. Seamless Safety Padding

1. Installation of Safety Padding

- a. Inspect surfaces to receive seamless safety padding. Notify the architect in writing if surfaces are not satisfactory for application of materials. Commencement of work constitutes acceptance of surface.
- b. All vertical panels will be mechanically fastened to walls.
- c. The number of fasteners per panel will be determined by the installers and is based on type of substrate.
- d. A gap of 1/8 inch +/- 1/16 inch will be left between panels. They will then be filled with epoxy compound. When fully cured, it will be sanded to meet adjacent edges.
- e. Fill all fastener holes with epoxy and sand. Upon completion of sanding all surfaces (walls, doors, ceiling, and floor), all surfaces to receive a finish topcoat.

2. Precautions

- a. The following conditions are required for the installation and storage of materials:
 - 1) Provide for adequate storage of materials.
 - 2) Minimum temperature of 65 degrees F to be maintained for the duration of the installation.
 - 3) Provide 120-volt electrical service, storage in a safe, warm and dry area, hoisting equipment and refuse receptacle.

3.03 **ADJUSTING**

- A. Adjust operable elements for smooth operation.

3.04 **CLEANING**

- A. Clean specified products accordance with manufacturer's instructions

3.05 **CLOSEOUT ACTIVITIES**

- A. Demonstrate proper operation of equipment to Owner's designated representative.
 1. Briefly describe function, operation, and maintenance of each component.

3.06 **PROTECTION**

- A. Protect installed products from subsequent construction operations.

END OF SECTION

SECTION 10 1100 - VISUAL DISPLAY UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Markerboards
- B. Tackboards
- C. Tack strips

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking and supports.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard 2016.
- B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling 2018.
- C. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board 2012, with Editorial Revision (2019).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations.
 - 1. Include locations and layout of graphics.
 - 2. Include sections indicating trim profiles.
- D. Samples:
 - 1. Markerboard Finishes: Submit 3 samples of each finish 2 by 2 inch in size illustrating finish, color, and texture.
 - 2. Composition and Natural Cork Sheet: Submit 3 samples of each finish, 2 by 2 inch in size illustrating finish, color, and texture.
 - 3. Fabrics: Submit 3 samples of each fabric, 8 by 10 inch inch in size illustrating color, finish, and texture.
 - 4. Trim: Submit 3 samples, 6 inches long, of each trim profile, including chalk trays, map rails, tack strips, and edge trim
- E. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- F. Test Reports: Show compliance to specified surface burning characteristics requirements.
- G. Maintenance Data: Include data on regular cleaning, stain removal.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years documented experience.
- B. Installer Qualifications: Company experienced in installing the products specified in this section with minimum 5 years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package visual display boards as required to prevent damage before installation.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide Life of the building warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Visual Display Boards:
 - 1. Claridge Products and Equipment, Inc: www.claridgeproducts.com/.
 - 2. Egan Visual, Inc.; www.egan.com.
 - 3. PolyVision Corporation: www.polyvision.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

2.03 VISUAL DISPLAY UNITS

- A. Markerboards MB1: Porcelain enamel on steel, laminated to core.
 - 1. Color: White.
 - 2. Steel Face Sheet Thickness: 24 gage, 0.0239 inch .
 - 3. Core: Particleboard, 1/2 inch thick, laminated to face sheet.
 - 4. Backing: Aluminum sheet, laminated to core.
 - 5. Sizes: As indicated on drawings.
 - 6. Panel Orientation: Vertical
 - 7. Seams: Concealed trim at seams.
 - 8. Perimeter Frame: Extruded aluminum , with concealed fasteners.
 - 9. Accessories: Provide Magnetic Marker Tray.
 - 10. Frame Finish: Anodized, natural.
- B. Markerboards MB2: Porcelain enamel on steel, laminated to core with custom printed pattern.
 - 1. Color/Pattern: Aqua (008)/ Homegrown G
 - 2. Thickness: 13mm
 - 3. Finish: High Gloss
 - 4. Panel Size: 3'-11" x 9'-4"
 - 5. Overall Size: As indicated on drawings.
 - 6. Panel Orientation: Vertical
 - 7. Seams: Concealed trim at seams.
 - 8. Perimeter Frame: Extruded aluminum , with concealed fasteners.
 - 9. Accessories: Provide [Magnetic Marker Tray].
 - 10. Frame Finish: Anodized, natural.
 - 11. Product:
 - a. Manufacturer: DesignTex; Bespoke Surface Imaging on Polyvision a3 CeramicSteel Workwall
 - b. Manufacturer's Representative: Tanya Romanelli (810) 444-8797

2.04 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
- C. Fiber Board: ASTM C208, cellulosic fiber board.
- D. Aluminum Sheet Backing: 0.15 inch thick.
- E. Adhesives: Type used by manufacturer.

2.05 TRIM AND ACCESSORIES

- A. Frame Profile: Extruded aluminum. Manufacturer's standard J-trim.
- B. Mounting Hardware: Concealed. Include brackets and all related fasteners and hardware required for a complete installation on substrates indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that internal wall blocking is ready to receive work and positioning dimensions are as instructed by the manufacturer.

3.02 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Install visual display units in locations and at heights indicated.
- C. Secure units level and plumb using adhesive and mechanical fasteners.
 - 1. Adhesive: Adhere units to substrates with adhesive placed in patches 16 inches on center each way.
 - 2. Fasteners: Mechanically attach units to substrates with concealed mounting brackets not more than 16 inches on center along tops and bottoms of units.
 - a. Minimum of 2 fasteners at top and bottom of each board, or panel in a combination unit.
 - 3. Where possible, locate wall fasteners at masonry and tile joints; do not penetrate masonry or tile faces.

3.03 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.

END OF SECTION

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SECTION 10 1400 - SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Room and door signs.
- B. Dimensional characters.
- C. Plaques.

1.02 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on each type of sign.
- C. Shop Drawings: For each sign type, provide dimensioned elevation including letter sizes and locations, graphics, colors and finishes, mounting methods, mounting heights, and material descriptions.
- D. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - 1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
 - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - 3. Submit for approval by Owner through Architect prior to fabrication.
- E. Samples:
 - 1. Room and Door Signs: Submit 3 samples of each type of sign construction, of size similar to that required for project, illustrating sign style, font, colors, and method of attachment.
 - 2. Dimensional Characters: Submit 3 samples, full size, of each dimensional character style, font, color, and method of attachment.
 - a. For specified sizes 12 inches and under, provide samples matching specified size.
 - b. For specified sizes over 12 inches, provide 12 inch high samples unless actual specified size requested by Architect.
 - 3. Plaques: Provide samples upon Architect's request.
- F. Verification Samples: Submit samples showing colors specified.
 - 1. Where colors are not specified, submit two sets of color selection charts or chips.
- G. Maintenance Data: Include data on regular cleaning.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company experienced in installing the products specified in this section with minimum 5 years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Room and Door Signs:
 - 1. Foresight Supersign: www.foresightsupersign.net.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Dimensional characters:
 - 1. A.R.K. Ramos: www.arkramos.com.
 - 2. Gemini Inc.: www.geminisignproducts.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- C. Plaques:
 - 1. A.R.K. Ramos: www.arkramos.com.
 - 2. Gemini Inc.: www.geminisignproducts.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOM AND DOOR SIGNS

- A. Sign Type: Flat signs with die-raised panel media as specified. Tactile characters and Braille shall be integral to sign face; separate adhesively-fixed characters are not permitted. Frameless.
 - 1. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
 - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
- B. Materials:
 - 1. Sign Material: Aluminum sheet, 0.102 inch thick, with smooth, flat, level surfaces.
 - 2. Backing Plate: None, unless otherwise indicated.
- C. Sign Properties:
 - 1. Sign Sizes and Shapes: As indicated.
 - 2. Character and Graphic Layouts: As indicated.
 - 3. Character Styles (Fonts): As indicated.
 - 4. Character Sizes: As indicated.
 - 5. Pictograms and Graphics: As indicated.
- D. Colors and Finish:
 - 1. Background Colors: As indicated.
 - 2. Character Colors: As indicated.
 - 3. Pictograms and Graphics Colors: As indicated.
- E. Miscellaneous:
 - 1. Changeable Message Inserts: Manufacturer's standard "window" section for replaceable text inserts; provide where indicated.
 - a. Window shall have a transparent cover to protect changeable messages.
 - b. Windows shall accommodate printed paper and engraved inserts.
 - c. Unless otherwise indicated, window opening shall have corner radiuses of 1/4 inch.
- F. Mounting:
 - 1. Walls Tape adhesive.
 - 2. Glass: Tape adhesive with matching plate of same material as sign, on opposite side of glass to conceal mounting materials.
 - 3. Bracket-Mounted 2-Sided Signs - Walls and Ceilings: Aluminum wall bracket, powder coated, color selected from manufacturer's standard colors, attached with screws in predrilled mounting holes.
- G. Locations - General:
 - 1. Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
- H. Sign Layouts - General: Unless otherwise indicated provide the following:

1. Classrooms and Offices: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide changeable message inserts. Include braille.
2. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings. Include braille.
3. Storage and Janitor's Closet Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings. Include braille.
4. Mechanical, Electrical, and Other Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings. Include braille.
5. Rest Rooms: Identify with pictograms, the names "MEN" or "BOYS" and "WOMEN" or "GIRLS", and braille.
6. Stairways: Identify with pictograms and the name "STAIR", and braille.
7. Elevators: Identify with pictograms and the name "ELEVATOR", and braille.
 - a. Emergency Text and Pictograms: Comply with requirements of authorities having jurisdiction indicating that in case of fire, elevators are out of service and stairway exits should be used instead.

2.03 PLAQUES

A. Metal Plaques:

1. Metal: Aluminum casting.
 - a. Aluminum: In alloy and temper as recommended by plaque manufacturer.
 - b. Cast plaques with precisely formed profiles, characters, lines, and edges; without pits and other imperfections.
2. Plaque Properties:
 - a. Size: As indicated
 - b. Border Style: Equal to A.R.K. Ramos; Style 513.
 - c. Background Texture: Equal to A.R.K. Ramos; Pebble.
 - d. Character and Graphic Layouts: As indicated.
 - e. Character Styles (Fonts): As indicated.
 - f. Character Sizes: As indicated.
 - g. Pictograms and Graphics: As indicated.
3. Finish:
 - a. Raised Characters and Graphics: Equal to A.R.K. Ramos; Satin Bronze.
 - b. Background: Equal to A.R.K. Ramos; Dark Oxidized.
4. Mounting: Concealed non-corrosive studs for masonry walls.

2.04 DIMENSIONAL CHARACTERS

A. Metal Characters:

1. Cast Characters: Form individual characters by casting.
 - a. Fabricate characters with smooth surfaces and precisely formed profiles, lines, and edges; without pits and other imperfections. Cast lugs into back of characters and tap for threaded mounting studs.
 - b. Material:
 - 1) Aluminum: In alloy and temper as recommended by dimensional character manufacturer.
 - c. Character Styles (Fonts): As indicated.
 - d. Character Sizes: As indicated.
 - e. Finish: Clear anodized.
 - f. Mounting: Manufacturer's standard non-corrosive concealed studs (pin mounting). Provide fasteners as applicable for substrates indicated.
 - 1) Projected Mounting: Mount dimensional characters 1 inch off substrate; from face of substrate to back of dimensional character.
 - 2) At exterior locations, provide stainless steel fasteners and hardware.
2. Cut Characters: Cut characters from solid plate of thickness and metal indicated.
 - a. Precisely cut characters with smooth square edges.

- b. Characters shall be flat and free of warps, distortions or other surface imperfections.
 - c. Material:
 - 1) Aluminum Plate: ASTM B209 in alloy and temper as recommended by dimensional character manufacturer.
 - (a) Thickness: 3/8 inch.
 - d. Character Styles (Fonts): As indicated.
 - e. Character Sizes: As indicated.
 - f. Finish: Clear anodized.
 - g. Mounting: Manufacturer's standard non-corrosive concealed studs (pin mounting). Provide fasteners as applicable for substrates indicated.
 - 1) Projected Mounting: Mount dimensional characters 1 inch off the substrate; from face of substrate to back of dimensional character.
 - 2) At exterior locations, provide stainless steel fasteners and hardware.
3. Fabricated Characters: Cut characters from metal sheet and thickness indicated.
- a. Precisely form characters with welded returns; welds shall be ground smooth and continuous.
 - b. Characters shall be flat with sharp defined corners; free of warps, distortions or other surface imperfections.
 - c. Material:
 - 1) Aluminum Sheet: ASTM B209 in alloy and temper as recommended by dimensional character manufacturer.
 - (a) Character Face Thickness: 0.09 inch, minimum.
 - (b) Character Return Thickness: 0.063 inch, minimum.
 - d. Character Styles (Fonts): As indicated.
 - e. Character Sizes: As indicated.
 - f. Character Return/Depths: As indicated.
 - g. Finish: Clear anodized.
 - h. Mounting: Manufacturer's standard non-corrosive concealed studs (pin mounting). Provide fasteners as applicable for substrates indicated.
 - 1) Projected Mounting: Mount dimensional characters 1 inch off the substrate; from face of substrate to back of dimensional character.
 - 2) At exterior locations, provide stainless steel fasteners and hardware.

2.05 ACCESSORIES

- A. Tape Adhesive: Double sided tape, permanent adhesive.
 - 1. Acrylic, foam carrier, pressure-sensitive tapes with release liner for permanent bonding.
 - a. Products:
 - 1) 3M; VHB Tapes: www.3M.com.
 - (a) Provide specific VHB tape as recommended by tape manufacturer for applicable substrates.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

- A. General:
 - 1. Install in accordance with manufacturer's instructions.
 - 2. Install neatly, with horizontal edges level.
- B. Room and Door Signs:
 - 1. Mounting Locations: Unless otherwise indicated, mount signs as follows:
 - a. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

C. Dimensional Characters:

1. Mount dimensional characters at heights and locations indicated; with characters equally spaced unless otherwise indicated.

D. Plaques:

1. Mount plaques at heights and locations indicated.

3.03 CLEANING AND PROTECTION

- A. Clean signage as recommended by signage manufacturer.
- B. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION

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05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

SIGNAGE
10 1400-6

SECTION 10 2113.17 - PHENOLIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Phenolic toilet compartments.
- B. Urinal screens.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Concealed steel support members.
- B. Section 06 1000 - Rough Carpentry: Blocking and supports.
- C. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- D. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with placement of support framing and anchors in walls and ceilings.
 - 2. Coordinate the work with floor drain locations.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and floor supports, door swings.
 - 1. Indicate reinforcement locations for partition-mounted grab bars and surface-mounted toilet accessories.
 - 2. Show floor drain locations.
- D. Samples:
 - 1. Submit 3 samples of partition panels, 6 by 6 inch in size illustrating panel finish, color, and sheen.
 - 2. Submit 3 sample sets of hardware and accessories indicating material and finish; each set to include door latch, hinge, and panel bracket.
- E. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- F. Test Reports: Show compliance to specified surface burning characteristics requirements.
- G. Maintenance Data: Include data on regular cleaning.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Door Hinges: Quantity equal to 2 percent of total installed, but not less than 4; including fasteners.
 - 3. Door Latch, Strike, and Keeper: Quantity equal to 2 percent of total installed, but not less than 4; including fasteners.
 - 4. Door Bumper: Quantity equal to 2 percent of total installed, but not less than 4; including fasteners.
 - 5. Door Pull: Quantity equal to 2 percent of total installed, but not less than 2; including fasteners.
 - 6. Fasteners: Quantity equal to 2 percent of each fastener type and size installed, but not less than 10 fasteners of each type and size.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company experienced in installing the products specified in this section with minimum 5 years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package partition panels and material as required to prevent damage before installation.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide 10 year warranty against defects in workmanship and materials, including delamination, breakage, and corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Phenolic Toilet Compartments:
 - 1. Accurate Partitions Corp., an ASI Group company: www.accuratepartitions.com.
 - 2. All American Metal Corp - AAMCO: www.allamericanmetal.com.
 - 3. Bobrick Washroom Equipment, Inc.: www.products.bobrick.com.
 - 4. Bradley Corporation: www.bradleycorp.com.
 - 5. Flush Metal Partitions, LLC: www.flushmetal.com.
 - 6. General Partitions Mfg. Corp: www.generalpartitions.com.
 - 7. Global Partitions Corp., an ASI Group company: www.globalpartitions.com.
 - 8. Knickerbocker Partition Corp.: www.knickerbockerpartition.com.
 - 9. Substitutions: Section 01 6000 - Product Requirements.

2.02 PHENOLIC TOILET COMPARTMENTS

- A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid phenolic core panels with integral melamine finish, ceiling-hung.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 2. Surface Burning Characteristics:
 - a. Class B per ASTM E84; flame spread 75, maximum, and smoke developed 450, maximum.
 - 3. Color: Two standard colors as selected by Architect.
- B. Doors:
 - 1. Thickness: 3/4 inch.
 - 2. Width: 24 inch, unless otherwise indicated.
 - 3. Width for Handicapped Use: 36 inch, out-swinging, unless otherwise indicated.
 - 4. Height: 58 inch.
- C. Panels:
 - 1. Thickness: 1/2 inch.
 - 2. Height: 58 inch.
 - 3. Widths: As indicated.
- D. Pilasters:
 - 1. Thickness: 3/4 inch.
 - 2. Width: As required to fit space; minimum 3 inch.
- E. Urinal Screens: Wall mounted with continuous panel brackets.
 - 1. Construction: Same as panels.
 - 2. Width: 24 inches, unless otherwise indicated.
 - 3. Height: 42 inches, unless otherwise indicated.

2.03 ACCESSORIES

- A. Pilaster Shoes: Formed ASTM A666 Type 304 stainless steel with No. 4 finish, 3 inch high, concealing ceiling fastenings.
 - 1. Provide ceiling attachment using two adjustable hanging studs, attached to above-ceiling framing.
- B. Head Rails: Hollow stainless steel, 1 inch by 1-1/2 inch size, with anti-grip profile and cast socket wall brackets.
- C. Wall, Pilaster, and Urinal Screen Brackets: Satin stainless steel; continuous type.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 - 1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- E. Hardware: Satin stainless steel; heavy-duty type.
 - 1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 - 2. Door Latch: Slide type with exterior emergency access feature.
 - 3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 - 4. Coat hook with rubber bumper; one per compartment, mounted on door.
 - 5. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Align tops of doors and panels.
- D. Attach panel brackets securely to walls using anchor devices.
- E. Wall fasteners shall be located at masonry and tile joints; do not penetrate masonry or tile faces.
- F. Align wall brackets and pilaster brackets.
- G. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- H. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return outswinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

SECTION 10 2123 - CUBICLE CURTAINS AND TRACK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface mounted overhead curtain track and guides.
- B. Cubicle curtains.

1.02 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics and curtain track assembly.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Samples:
 - 1. Curtain Track: Submit three 12 inch long samples of curtain track illustrating profile and finish; include curtain carrier.
 - 2. Fabric: For each type of fabric and color, submit 3 fabric samples, 12 by 12 inch in size illustrating fabric color.
- E. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Carriers: Ten.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years of documented experience.
- B. Installer Qualifications: Company experienced in installing the products specified in this section with minimum 5 years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package curtain track assemblies, curtains, and other material as required to prevent damage before installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cubicle Track and Curtains:
 - 1. A. R. Nelson Co; 1200CT Track System: www.arnelson.com.
 - 2. C/S Construction Specialties; 6062 Track System: www.c-sgroup.com.
 - 3. Inpro Corp.; Clickeze Optitrac: www.inprocorp.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 TRACKS AND TRACK COMPONENTS

- A. Tracks: Extruded aluminum sections; one piece per track run, where possible.
 - 1. Profile: Channel.
 - a. Size: 1-3/8 inches wide by 3/4 inch deep.
 - 2. Mounting: Surface.
 - 3. Structural Performance: Capable of supporting vertical test load of 50 lbs 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, Tees, and Y's: To fit track section.
 - 5. Track Bends: Minimum 12 inch radius; fabricated without deformation of track section or impeding movement of carriers.
 - 6. Finish on Exposed Surfaces: White enamel.

- B. Curtain Carriers: Nylon rollers, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.
 - 1. Provide nylon axle and 2 wheels with stainless steel or nickel plated ball chain or nylon swivel.
 - 2. Provide aluminum, nickel plated, or stainless steel hooks.
 - 3. Provide 2 carriers per foot of track length, minimum.
- C. Wand: Aluminum or plastic, attached to lead carrier, for pull-to-close action.
- D. Installation Accessories: Types required for specified mounting method and substrate conditions.

2.03 CURTAINS

- A. Cubicle Curtains:
 - 1. Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - 2. Material: Close weave polyester.
 - a. Polyester Fabric:
 - 1) Products:
 - (a) Architex; Rx 6016: Website.
 - (b) Substitutions: Not permitted.
 - 2) Color/Pattern: Cottonwood.
 - 3) Width: 72 inches.
 - 3. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, white color.
 - 4. Attachment of Curtain Fabric to Open Mesh Cloth: Manufacturer's standard sewn seam.
 - B. Curtain Fabrication:
 - 1. Width of curtain to be 15 percent wider than track length.
 - 2. Length of curtain to end 10 inches above finished floor.
 - 3. Include open mesh cloth at top 18 inches of curtain for room air circulation, attached to curtain as specified above.
 - 4. Curtain Heading: Web reinforced band of open mesh cloth with metal grommet holes for carriers spaced 6 inches on center.
 - 5. Seams and Hems: Manufacturer's standard fabrication method for securely sewn and finished seams and hems.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work of this Section.

3.02 INSTALLATION

- A. Install specified products in accordance with manufacturer's instructions.
- B. Install curtain track to be secure, rigid, and true to ceiling line.
- C. Secure track to ceiling system; install end stops, Tees, and Y's.
- D. At ceilings with metal grid suspension systems, fasten track directly to grid; to not attach to acoustical lay-in panels.
- E. Install curtains on carriers ensuring smooth operation.

3.03 PROTECTION

- A. Protect installed curtain track and curtains from subsequent construction operations.

END OF SECTION

SECTION 10 2600 - WALL AND DOOR PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.

1.02 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements and anchorage details.
- C. Shop Drawings: Include plans, elevation, sections, and attachment details.
- D. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
 - 1. For each type and finish of corner guard, submit 3 samples, 12 inches long.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Corner Guard Covers: Quantity equal to 2 percent of total installed, but not less than 4; in same lengths as installed units.
- G. Maintenance Data: For each type of product . Include information regarding recommended and potentially detrimental cleaning materials and methods.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.
- C. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty against defects in workmanship and materials.

PART 2 PRODUCTS

2.01 PRODUCT TYPES

- A. CG-1Corner Guards - Stainless Steel, Surface Mounted:
 - 1. Material: Type 304 stainless steel, No. 4 finish, 16 gage, 0.06 inch thick.
 - 2. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 3. Width of Wings: 3-1/2 inches.
 - 4. Corner: Square.
 - 5. Corner Angle: 90 degrees; and as otherwise indicated.
 - 6. Length: One piece.
 - a. Extend floor to ceiling; unless otherwise indicated.
 - 7. Mounting: Mount using adhesive as recommended by corner guard manufacturer.

8. Products:
 - a. Construction Specialties, Inc; Model CO-8: www.c-sgroup.com.
 - b. Inpro Corp; Stainless Steel Corner Guards: www.inprocorp.com.
 - c. Koroseal Interior Products, LLC; Korogard Model GS35: www.koroseal.com.
 - d. Pawling Corporation; Model CG-50: www.pawling.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- B. CG-2 Corner Guards - Plastic, Surface Mounted:
 1. Material: One of the following, with full height extruded aluminum retainer:
 - a. High impact vinyl.
 - b. Polyethylene terephthalate (PET or PETG); PVC-free.
 2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
 3. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 4. Width of Wings: 3 inches.
 5. Corner: Radiused, 1/4 inch.
 6. Corner Angle: 90 degrees; and as otherwise indicated.
 7. Color: As selected from manufacturer's standard colors.
 8. Projection From Wall to Outside of Guard: 3/8 inch, maximum.
 9. Length: One piece.
 - a. Extend floor to ceiling; unless otherwise indicated.
 10. Preformed end caps.
 11. Products:
 - a. Construction Specialties, Inc; Model SM-20AN: www.c-sgroup.com.
 - b. Inpro Corp; Model 150 High Impact: www.inprocorp.com.
 - c. Koroseal Interior Products, LLC; Model G200-Series: www.koroseal.com.
 - d. Pawling Corporation; Model CG-10: www.pawling.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- C. CG-3 Corner Guards - Plastic, Flush Mounted:
 1. Material: One of the following, with full height extruded aluminum retainer:
 - a. High impact vinyl.
 - b. Polyethylene terephthalate (PET or PETG); PVC-free.
 2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
 3. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 4. Width of Wings: 3 inches.
 5. Corner: Radiused, 1/4 inch.
 6. Corner Angle: 90 degrees; and as otherwise indicated.
 7. Color: As selected from manufacturer's standard colors.
 8. Projection From Wall to Outside of Guard: 3/8 inch, maximum.
 9. Length: One piece.
 - a. Extend floor to ceiling; unless otherwise indicated.
 10. Preformed end caps.

11. Products:
 - a. Construction Specialties, Inc; Model SFS-20N: www.c-sgroup.com.
 - b. Inpro Corp; Model 150F Flush Mount: www.inprocorp.com.
 - c. Koroseal Interior Products, LLC; Model R400-Series: www.koroseal.com.
 - d. Pawling Corporation; Model CGT-7: www.pawling.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FABRICATION

- A. Fabricate components with tight joints, corners and seams.

2.03 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work of this Section.
- B. For flush mounted corner guards, verify that gypsum board recess is properly sized.
- C. Verify that substrate surfaces for adhered items are clean and smooth.
 1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer. Follow adhesive manufacturer's recommendations for remedial measures at locations and/or application conditions where adhesion test's results are unsatisfactory.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Position corner guard 4 inches above finished floor to ceiling; unless otherwise indicated.
- C. Stainless Steel Corner Guards:
 1. Adhere each wing of corner guard to substrate.
- D. Corner Guards - Plastic, Surface Mounted:
 1. Mechanically fasten continuous metal retainers to substrate.
 2. Snap-on plastic finish cover.
- E. Corner Guards - Plastic, Flush Mounted:
 1. Mechanically fasten continuous metal retainers to substrate; flanges shall overlap gypsum board.
 2. Refer to Section 09 2900 - Gypsum Board for finishing flanges with joint compound.
 3. Snap-on plastic finish cover.

3.03 TOLERANCES

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

3.04 CLEANING

- A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Commercial toilet, shower, and bath accessories.
- B. Diaper Changing Stations.
- C. Toilet Room Support Stations.
- D. Utility room accessories.

1.02 RELATED REQUIREMENTS

- A. Section 09 2216 Non-Structural Metal Framing: Concealed supports for accessories, including in wall framing and plates, above ceiling framing, and [_____].
- B. Section 09 3000 - Hard Tiling: Ceramic washroom accessories.
- C. Section 10 2116-Phenolic Toilet Partitions

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service 2015a (Reapproved 2019).
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2019a.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- E. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings 2018.
- F. ASTM C1036 - Standard Specification for Flat Glass 2016.
- G. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- H. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use 2004, with Editorial Revision (2016).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Samples: When requested by Architect.
 - 1. Submit 3 sample for each color and finish, 2 by 2 inch in size.
- D. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- E. Operation and Maintenance Data: Include operating procedures and recommended cleaning methods.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Hand Dryer Filters: For units with filters, provide quantity equal to 2 filters per unit installed. .

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company experienced in installing the products specified in this section with minimum 5 years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package toilet, bath, and laundry accessories as required to prevent damage before installation.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Mirrors: Provide 15 year warranty against silver spoilage.
- C. Electric Hand Dryers: Provide 5 year warranty against defects in workmanship and materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design:
 - 1. Commercial Toilet, Shower, and Bath Accessories, including Utility Room Accessories: Provide product indicated or a comparable product by one of the following:
 - a. American Specialties, Inc, (ASI): www.americanspecialties.com.
 - b. Bobrick Washroom Equipment, Inc.: www.bobrick.com.
 - c. Bradley Corporation: www.bradleycorp.com.
 - d. Substitutions: Section 01 6000 - Product Requirements.
 - 2. Diaper Changing Stations: Provide product indicated or a comparable product by one of the following:
 - a. American Specialties, Inc, (ASI): www.americanspecialties.com.
 - b. Bobrick Washroom Equipment, Inc.: www.bobrick.com.
 - c. Bradley Corporation: www.bradleycorp.com.
 - d. World Dryer Corp.: www.worlddryer.com.
 - e. Substitutions: Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
- B. Keys: Provide 2 keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Zinc Alloy: Die cast, ASTM B86.
- G. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Owner furnished; Contractor installed.
- B. Toilet Towel Dispenser: Owner furnished; Contractor installed.
- C. Soap Dispenser - Wall-Mounted: Owner furnished; Contractor installed.
- D. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
 - 1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
 - 2. Size: As indicated on drawings.

3. Frame: Angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
 5. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-290.
- E. Grab Bars: Stainless steel, smooth surface.
1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
 - c. Finish: Satin.
 - d. Length and Configuration: As indicated on drawings.
 - e. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-5806 Series.
- F. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, removable receptacle.
1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-270.
- 2.05 **COMMERCIAL SHOWER AND BATH ACCESSORIES**
- A. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, hinges, and mechanical fasteners of Type 304 stainless steel, L-shaped reversible seat.
1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of white color.
 2. Size: ADA Standards compliant.
 3. Load: Supports 350 pounds, minimum.
 4. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-5181.
- B. Robe Hook - Single: Stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-76717.
- 2.06 **DIAPER CHANGING STATIONS**
- A. Diaper Changing Station: Wall-mounted, horizontal, folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
1. Material: Polyethylene.
 2. Mounting: Surface.
 3. Color: Standard color as selected by Architect.
 4. Minimum Rated Load: 300 pounds.
 5. Include an integral bed liner dispenser; 50 liner capacity.
 6. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; KB200
- 2.07 **TOILET SUPPORT STATIONS**
- A. Toilet Support Stations: Basis-of-Design: Rifton Model K710: rifton.com/products/bathing-and-toileting-systems/support-station-k710 NO SUBSTITUTIONS.
- 2.08 **UTILITY ROOM ACCESSORIES**
- A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
1. Drying rod: Stainless steel, 1/4 inch diameter.
 2. Hooks: Three, 0.06 inch stainless steel rag hooks at shelf front.
 3. Mop/broom holders: Four spring-loaded rubber cam holders at shelf front.
 4. Length: 36 inches.
 5. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-224.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

3.02 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As indicated and as required by accessibility regulations.
- D. Where possible, locate wall fasteners at masonry and tile joints; do not penetrate masonry or tile faces.

3.03 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 4400 - FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 04 2000 - Unit Masonry: Roughed-in wall openings.
- C. Section 09 2216 Non-Structural Metal Framing: Roughed-in wall openings.
- D. Section 09 9123 - Interior Painting: Field paint finish.

1.03 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).
- B. NFPA 10 - Standard for Portable Fire Extinguishers 2017, with Errata (2018).
- C. UL (DIR) - Online Certifications Directory Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, and anchorage details.
- C. Shop Drawings: Indicate locations of cabinets, cabinet physical dimensions, rough-in measurements for recessed cabinets, locations of individual fire extinguishers, mounting measurements for wall bracket, and accessories required for complete installation.
- D. Samples: When requested by Architect.
 - 1. Submit 3 sample for each color and finish, 2 by 3 inch in size.
- E. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company experienced in installing the products specified in this section with minimum 5 years documented experience.

1.06 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Fire Extinguishers: 5 year warranty against defects in workmanship and materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com.
 - 2. Croker Division of Fire-End and Croker Corp.: www.croker.com.
 - 3. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
 - 4. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 5. Nystrom, Inc: www.nystrom.com.
 - 6. Potter-Roemer: www.potterroemer.com.
 - 7. Substitutions: See Section 01 6000 - Product Requirements.

- B. Fire Extinguisher Cabinets and Accessories:
 - 1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com.
 - 2. Croker Division of Fire-End and Croker Corp.: www.croker.com.
 - 3. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 4. Nystrom, Inc: www.nystrom.com.
 - 5. Potter-Roemer: www.potterroemer.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or testing firm acceptable to authorities having jurisdiction for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size: 10 pound.
 - a. UL Rating: 4A-60B:C.
 - 3. Finish: Baked polyester powder coat, red color.
 - 4. Minimum Operational Temperature: Minus 65 degrees F.

2.03 FIRE EXTINGUISHER 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. Formed primed steel sheet; minimum 0.036 inch (20 gage) thick base metal.
- C. Fire Rated Cabinet Construction: Fire rating equal to wall in which installed.
 - 1. Primed steel; double wall or outer and inner boxes with 5/8 inch thick fire barrier material.
 - a. Minimum Thickness: 0.036 inch (20 gage).
- D. Cabinet Configuration: Recessed and semi-recessed type.
 - 1. Size to accommodate fire extinguisher.
 - 2. Trim - Recessed Cabinets: Flat square edge, with minimum 1-3/4 inch wide face. Stainless steel.
 - 3. Projected Trim - Semi-Recessed Cabinets: Returned to wall surface, with 2-1/2 inch rolled-edge projection, and 1-3/4 inch wide face. Stainless steel.
 - 4. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim.
- E. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with roller type catch. Hinge doors for 180 degree opening with continuous piano hinge.
 - 1. Metal: Stainless steel.
- F. Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
 - 1. Style: Vertical duo panel glazing.
- G. Door Pull: Manufacturer's standard flush/recessed pull handle.
- H. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- I. Weld, fill, and grind components smooth.
- J. Finish of Cabinet Exterior Trim and Door: No. 4 - Brushed stainless steel.
- K. Finish of Cabinet Interior: White; powder coat.

2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, painted black. Sized for fire extinguishers specified.
- B. Lettering: "FIRE EXTINGUISHER" diecut self-adhering black, equally spaced, lettering; provide in accordance with authorities having jurisdiction (AHJ).
 - 1. Locations: Unless otherwise indicated:
 - a. Fire Extinguisher Cabinets: Locate on glass.
 - 1) Lettering shall be applied at the factory.
 - b. Wall brackets: Locate above fire extinguisher and bracket.
 - 2. Orientation: Vertical.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets and fire extinguisher brackets plumb and level at mounting heights indicated and in accordance with authorities having jurisdiction (AHJ).
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets and on wall brackets.
- E. Apply fire extinguisher lettering to walls above wall bracket mounted fire extinguishers in accordance with authorities having jurisdiction (AHJ).
- F. Adjust cabinet doors for smooth operation.

3.03 PROTECTION

- A. Protect installed fire protection specialties from damage due to subsequent construction operations.

END OF SECTION

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SECTION 10 5113 - METAL LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal lockers.

1.02 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2019a.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.
- C. Shop Drawings: Indicate locker plan layout, numbering plan.
- D. Samples: Submit 3 samples 2 by 3 inches in size showing each color and finish of metal locker material.
- E. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Hooks: For each type, quantity equal to 2 percent of total installed, but not less than 50.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company experienced in installing the products specified in this section with minimum 5 years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect locker finish and adjacent surfaces from damage.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Lockers: Provide the following warranty lengths against defects in workmanship and materials.
 - 1. Knock-down Lockers: 2 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain lockers and locker benches from one manufacturer.
- B. Metal Lockers:
 - 1. Art Metal Products; Magnum Student KD Wardrobe Lockers
: www.artmetalproducts.com/#sle.
 - 2. ASI Storage Solutions; Traditional Plus Collection: www.asistorage.com.
 - 3. Hadrian Inc; Emperor Lockers: www.hadrian-inc.com
 - 4. List Industries, Inc; Marquis Student KD Lockers: www.listindustries.com/#sle.
 - 5. Penco Products, Inc; Guardian Defiant II Lockers: www.pencoproducts.com/#sle.
 - 6. Republic Storage Systems Co; Single Point II Corridor Lockers
: www.republicstorage.com/#sle.
 - 7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Accessibility: Comply with ICC A117.1 and ADA Standards.

2.03 LOCKER APPLICATIONS

- A. Wardrobe Lockers: Metal lockers, wall mounted with matching closed base.
 - 1. Width: 12 inches.
 - 2. Depth: 12 inches.
 - 3. Height: 72 inches.
 - 4. Configuration: Single tier.
 - 5. Fittings:
 - a. Hat shelf.
 - b. Coat rod.
 - c. Hooks: Two double prong.
 - 6. Ventilation: Louvers at top and bottom of door panel.
 - 7. Locking: Multi-point latching. Recessed handle and latch with padlock hasp., Recessed handle and latch with padlock hasp. Recessed handle and latch with padlock hasp..
 - 8. Provide sloped top.

2.04 METAL LOCKERS

- A. Lockers (L2: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.
 - 1. Where ends or sides are exposed, provide flush panel closures.
 - 2. Provide filler strips where indicated, securely attached to lockers.
 - 3. Color: To be selected by Architect.
- B. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
 - 1. Body and Shelves: 24 gage, 0.0239 inch.
 - 2. Base: 14 gage, 0.075 inch.
 - a. Galvannealed ASTM A653/A653M A40.
 - 3. Metal Base Height: 4 inch.
- C. Frames: Formed channel shape, welded and ground flush, welded to body.
 - 1. Door Frame: 16 gage, 0.0598 inch, minimum.
- D. Doors: Channel edge; welded construction, manufacturer's standard stiffeners, grind and finish edges smooth.
 - 1. Door Thickness: 14 gage, 0.0747 inch, minimum.
 - 2. Form recess for operating handle and locking device.
- E. Hinges: Continuous piano hinge with powder coat finish to match locker color.
- F. Sloped Top: 16 gage, 0.060 inch, with closed ends.
- G. Trim: 16 gage, 0.060 inch.
- H. Coat Hooks: Stainless steel or zinc-plated steel.
- I. Locks: Locker manufacturer's standard type indicated above.

2.05 FABRICATION

- A. Fabrication - General:
 - 1. Fabricate lockers with metal faces flat and free of warps and dents.
 - 2. Metal edges shall be finished smooth without burrs.
 - 3. Assembled lockers shall be rigid, square, and plumb.
 - 4. Provide fasteners, anchors, trim, closures, all all related hardware and accessories for a complete installation.
- B. Fabricate continuous sloping top, filler panels, recess trim, and continuous metal base in longest lengths possible, minimizing joints.
- C. Continuous Metal Base:
 - 1. Zee Base:
 - a. Flanged outward at top to provide locker support and toe space below locker and flanged inward at bottom for concealed anchoring to floor substrate.
 - 2. Provide vertical flat closure panels at exposed sides of lockers.

3. Provide corner pieces for changes in direction.
- D. Continuous Sloping Tops:
 1. Sloped tops shall be continuous across multiple lockers.
 2. At exposed ends provide verticle end cap closures.
 3. Provide sloped mitered corner pieces for changes in direction.
 4. Install with concealed fasteners.
- E. End Panels - Boxed End Panel: Provides a finished look to exposed locker ends.
 1. Boxed End Panels:
 - a. Boxed end panels shall conceal exposed fasteners and unused holes on an exposed locker side panel.
 - b. Boxed end panels shall be fabricated to 1 inch overall thickness.
 - c. Boxed end panels shall be installed with concealed fasteners.
 2. Provide one-piece end panels at back-to-back metal lockers.
- F. Recess Trim:
 1. Recess trim covers gaps between recessed lockers and adjacent walls and soffits.
 2. Install with concealed fasteners.
- G. Filler Trim:
 1. Filler trim fills gaps between lockers, and gaps between lockers and other obstructions.
 2. Install with concealed fasteners.

2.06 ACCESSORIES

- A. Fasteners and Anchors: As recommended by locker manufacturer.
 1. Anchors shall be of material and type suitable for indicated substrates.
 - a. Size as required to properly secure lockers to substrates.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that floors and walls are in compliance with requirements for locker installations.
- B. Verify that prepared bases are in correct position and configuration.

3.02 INSTALLATION

- A. Install lockers and benches in accordance with manufacturer's instructions.
- B. Place and secure on prepared base.
- C. Install metal bases plumb and square with concealed fasteners.
- D. Install lockers plumb and square.
- E. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds.
- F. Bolt adjoining locker units together to provide rigid installation.
- G. Bolt adjoining welded locker groups together.
- H. Install end panels, filler panels, recess trim, and sloped tops.
 1. Provide tight hairline joints.
 2. Use concealed fasteners unless otherwise indicated.
- I. Install fittings if not factory installed.
- J. Replace components that do not operate smoothly.

3.03 CLEANING AND ADJUSTING

- A. Clean locker interiors and exterior surfaces.
- B. Adjust door hardware for smooth operation and proper latching.

3.04 PROTECTION

- A. Protect installed lockers and benches from damage due to subsequent construction operations.

END OF SECTION

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METAL LOCKERS
10 5113-4

SECTION 10 5129 - PHENOLIC LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Phenolic lockers.
- B. Locker benches.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete Concrete base construction.
- B. Section 06 2000 - Finish Carpentry: Bench tops for locker bench support brackets.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.
- C. Shop Drawings: Indicate locker plan layout, numbering plan.
- D. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Phenolic Lockers:
 - 1. Art Metal Products; Versamax Lockers: www.artmetalproducts.com
 - 2. ASI Storage Solutions; Phenoic Traditional Collection: www.asistorage.com
 - 3. Columbia Lockers, a division of PSiSC; Phenolic Lockers: www.psisc.com/#sle.
 - 4. Hollman Lockers; Phenolic Lockers: www.hollman.com
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOCKER APPLICATIONS

- A. Student Lockers: Phenolic lockers, wall mounted for base indicated on drawings.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 2. Width: 12 inches.
 - 3. Depth: 12 inches.
 - 4. Height: 72 inches.
 - 5. Locker Configuration: Two tier.
 - 6. Fittings: Size and configuration as indicated on drawings.
 - a. Hooks: One double prong.
 - 7. Ventilation: By open space between the back of the door and locker body.
 - 8. Locking: Padlock hasps, for padlocks provided by Owner.
 - 9. Provide sloped top.
- B. Locker Benches: Stationary and Free Standing type; bench top of phenolic material; painted aluminum pedestals.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 2. Height: 17-19 inch.
 - 3. Length: as indicated on drawings.
- C. Free Standing Locker Bench Support Brackets: Welded structural aluminum double arm floor mount pedestal bench support brackets; pre-drilled for bench top material attachment and for floor anchorage.
 - 1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 2. Load Capacity per Bracket: 400 pounds.

3. Finish: As selected by architect from manufacturer's available options.
4. Bracket Spacing: 36 inches on center, maximum. Project-specific spacing to be determined based on field measurements.
5. Bracket-to-Floor Attachment: Fasteners/anchors recommended by bracket manufacturer for floor construction conditions encountered.
6. Bench Top: To Match Adjacent Phenolic Lockers.
 - a. Provide bench top at stationary built-in benches in front of lockers and at Free Standing benches.

2.03 PHENOLIC LOCKERS

- A. Lockers (L2): Factory assembled, made of phenolic core panels with mortise and tenon joints and stainless steel mechanical joint fasteners; fully finished inside and out; each locker capable of standing alone.
 1. Doors: Full overlay, covering full width and height of locker body; square edges.
 2. Panel Core Exposed at Edges: Machine polished, without chips or tool marks; square edge unless otherwise indicated.
 3. Where locker ends or sides are exposed, finish the same as fronts or provide extra panels to match fronts.
 4. Provide filler strips where indicated, securely attached to lockers.
 5. Door Color: As selected by Architect; allow for 2 different colors.
 6. Body Color: Manufacturer's standard white or light color.
 7. Fasteners for Accessories and Locking Mechanisms: Tamperproof type.
- B. Component Thicknesses:
 1. Doors: 1/2 inch minimum thickness.
 2. Locker Body: One of the following combinations:
 - a. Tops, bottoms, and shelves 3/8 inch; sides and backs 5/16 inch; minimum.
 3. End Panels and Filler Panels: 1/2 inch minimum thickness.
 4. Sloped Tops: 1/2 inch minimum thickness.
- C. Phenolic Core Panels: Nonporous phenolic resin and paper core formed under high pressure, with natural colored finished edges, integral melamine surface, matte finish, and uniform surface appearance; glued laminated panels not acceptable.
 1. Surface Burning Characteristics: Flame spread index of 75 or less, and smoke developed index of 450 or less; when tested in accordance with ASTM E84.
- D. Hinges: Stainless steel, satin finish; minimum of 180 degree opening; either exposed barrel 5-knuckle hinge attached to back of door and inside of body with tamperproof screws, or concealed cabinet style hinge attached with tamperproof screws.
- E. Coat Hooks: Stainless steel or reinforced nylon; attached with tamperproof screws.
- F. Number Plates: Manufacturer's standard, minimum 4-digit, permanently attached with adhesive; may be field installed.
- G. Locks: Locker manufacturer's standard type indicated above.
- H. Locker Legs: Manufacturer's standard adjustable support and leveling leg, minimum 1 inch adjustment; to be mounted to CMU base..

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared bases are in correct position and configuration.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Place and secure on prepared base.
- C. Install lockers plumb and square.
- D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds.

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- E. Bolt adjoining locker units together to provide rigid installation.
- F. Install end panels, filler panels, and sloped tops.
- G. Replace components that do not operate smoothly.

3.03 **CLEANING**

- A. Clean locker interiors and exterior surfaces.

END OF SECTION

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PHENOLIC LOCKERS
10 5129-4

SECTION 11 1300 - LOADING DOCK EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Loading dock bumpers with manual dock leveler.
- B. Full Access Dock Seal

1.02 REFERENCE STANDARDS

- A. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling 2017.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2013.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2013.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2014.
- H. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates 2015.
- I. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions 2015a.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015, with Errata (2016).

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide materials and finish, construction and installation details, roughing-in measurements, and component connections and details.
- C. Shop Drawings: Indicate required opening dimensions and tolerances, perimeter conditions of construction, and diagrams for power and control wiring.
 - 1. Include plans, elevations, sections, and details.
- D. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

1.05 FIELD CONDITIONS

- A. Existing Conditions: Field verify dimensions of construction related to loading dock equipment prior to fabrication, including recessed pit dimensions, slope of inclined dock approach, and dock height.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- B. Manufacturer agrees to correct defective work within two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 LOADING DOCK BUMPERS

- A. Manufacturers:
1. Beacon Industries, Inc.: www.beacontechnology.com.
 2. Blue Giant Equipment Corporation: www.bluegiant.com.
 3. Pioneer Dock Equipment: www.pioneerleveler.com.
 4. Rite-Hite Corp.: www.ritehite.com.
 5. Rotary Products, Inc.: www.rotaryproductsinc.com.
- B. Molded Rubber Loading Dock Bumpers: Molded rubber, ozone resistant, nylon reinforced, Shore A Durometer of 70, minimum, and tensile strength of 950 to 1050 psi, minimum.
1. Basis-of-Design: Economy Edge of Deck; manufactured by Beacon Industries, Inc.: www.beacontechnology.com
 - a. Projection From Wall: 12 inches, minimum.
 - b. Vertical Height: 10 inches, minimum.
 - c. Width: 5 inches, minimum.
 - d. Profile: Rectangular.
 - e. Attachment Hardware: 3/4 inches diameter galvanized bolts with expansion shields.
 - f. Capacity: 20,000 pounds, minimum.

2.02 FULL ACCESS DOCK SEAL

- A. Manufacturers:
1. Basis-of-Design: Blue Giant Equipment Corporation; Adjustable Head Curtain Full Access Dock Seal: www.bluegiant.com.
 2. Beacon Industries, Inc: www.beacontechnology.com
 3. Pioneer Dock Equipment: www.pioneerleveler.com.
 4. Rite-Hite Corp.: www.ritehite.com.
 5. Rotary Products, Inc.: www.rotaryproductsinc.com.
- B. Dock Seal
1. Fit standard overhead coiling doors.
 2. Seals Trailer Heights: 12 feet to 13.5 feet on typical 4 foot high dock.
 3. Components: One (1) hook and loop fastener split adjustable head curtain, two (2) foam side pads, two (2) bottom draft flaps.
 4. Side Pad Material: Polyurethane foam core with 98 percent memory, maintaining flexibility at -40 degrees F, bonded to kiln dried preservative treated lumber backing.
 5. Cover Material: Polyester base using 22 oz. premium grade vinyl.
 6. Head Curtain: Adjustable hook and loop fastener-split type: 30 inches with a rope and pulley system.
 7. Side pads: 20 inches wide x 126 inches high x 16 inch projection. Eight (8) inch backer with a four (4) inch x 24 inch heat sealed yellow guide strip.
 8. Mounting hardware: Galvanized.

2.03 MATERIALS

- A. Structural Steel Sections: ASTM A36/A36M.
- B. Checkered Steel Plate: ASTM A786/A786M, rolled steel floor plate; manufacturer's standard pattern.
- C. Steel Plates, Shapes, and Bars: ASTM A6/A6M or ASTM A283/A283M.
- D. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.
- E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- F. Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized in accordance with ASTM A153/A153M where connecting galvanized hardware components.

G. Galvanizing

1. Galvanizing: Hot-dip galvanize to minimum requirements of ASTM A123/A123M.
 - a. Touch up abraded areas after fabrication using specified touch-up primer for galvanized surfaces.
2. Metal Plate Platform: Hot dip galvanized to 1.25 oz/sq ft finish.
3. Frame: Hot dip galvanized to 1.25 oz/sq ft finish.
4. Railing: Hot dip galvanized to 1.25 oz/sq ft finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine loading dock equipment area for compliance with requirements for installation tolerances and other conditions related to this work.
 1. Verify that anchor placement is acceptable.
- B. Examine rough-in for electrical systems of loading dock equipment to verify openings and locations are acceptable prior to installation of equipment.
- C. Examine walls and floors of loading dock equipment concrete pits for suitable conditions, verify that pits are plumb and square, and properly sloped back to front of loading dock for drainage.
- D. Proceed with installation after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare loading dock equipment for size and locations as indicated, and provide anchoring devices with templates, diagrams, and installation instructions.

3.03 INSTALLATION

- A. Install loading dock equipment in accordance with manufacturer's instructions.
- B. Set square and level.
- C. Loading Dock Bumpers:
 1. Secure angled end frames to concrete substrates.
- D. Loading Dock Seal:
 1. Install plumb and level.
 2. Verify proper operation, test and adjust.

3.04 ADJUSTING

- A. Adjust operable equipment for smooth and balanced operation; lubricate as recommended by manufacturer.
- B. Test dock lifts for vertical travel within operating range as indicated, and adjust as necessary for proper operation.
- C. After installation, inspect exposed factory finished loading dock equipment, and repair damaged finishes.

3.05 CLEANING

- A. Clean installed components.

3.06 DEMONSTRATION AND TRAINING

- A. Demonstration: Demonstrate operation of loading dock equipment to Owner's personnel.
 1. Use operation and maintenance data as reference during demonstration.
 2. Briefly describe function, operation, and maintenance of each component.

END OF SECTION

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SECTION 11 4000 – FOOD SERVICE EQUIPMENT

GENERAL REQUIREMENTS

RELATED DOCUMENTS

The general provisions of the Contract, including instructions to bidders, General Conditions, Supplementary Conditions, General Requirements, apply to the work specified in this section.

1. DESCRIPTION

The fabrication requirements attached are a governing part of this specification and shall be consulted for all matters pertaining to the work. When references are made to FSEC, the same shall be construed to designate the Food Service Equipment Contractor.

The FSEC is to provide all items, articles, materials, transportation, operations, and methods listed, mentioned, or scheduled on the drawings and specifications, including all labor, materials, equipment, and incidentals necessary and as required for their completion.

2. QUALITY ASSURANCE

Brands and Names

The manufacturer's catalog designations used in the following specifications are intended to illustrate and represent the standards which will be required by the Owner. Bidders are to list, by item number, manufacturer's name and quantities on itemized proposal form attached to the specifications for approval by the Owner. When not attached, the FSEC shall make up his own itemized list and submit same attached with his bid. NOTE! Base Bid must be on fixtures specified for fair comparison of all bids.

Substitutions

Substitutions by any bidder wishing to supply alternate equipment other than that specified may submit a separate itemized proposal on similar articles of other manufacturers of the same standard performance, capacity, size, durability and appearance but must accompany their alternate proposal with complete descriptive literature of the item quoted.

Owner and Architect reserve the right to accept or reject such proposed substitutions. Bidders recommending such substitutions are cautioned to examine the mechanical plans that may have already been approved and conditions at the building site to determine if such substitutions require changes in mechanical connections already planned or installed.

If the proposed substitutions require such changes, the Bidder shall include the cost of same in his bid and call it to the attention of the Architect and Owner by including a descriptive notation in his bid.

Discrepancies

Where model numbers, quantities, sizes or gauges of material differ on plans and specifications, it shall be understood that the FSEC shall figure the larger quantities, longest size and heavier gauge unless advised otherwise in writing.

Where an accessory or piece of equipment is shown on elevation or plan, it shall be deemed part of the Food Service Contract, even if it is not listed in the Item Specifications.

Where an item is listed in Item Specifications and not shown on plan or elevations, the item shall be deemed part of the Food Service Equipment Contract.

Measurements

All dimensions given on bidding documents are approximate and are as accurate as can be determined at the time. The Equipment Contractor shall check all measurements at the building prior to fabrication of equipment and shall bring any deviation from the dimensions shown or required by building conditions to the Consultant's attention. All equipment must conform to the finished building conditions. Where obstructions occur, equipment must be neatly scribed fitting to and around same resulting in a sanitary fixture.

Prior to fabrication, the Consultant or the Owner reserves the right to require the Contractor to make reasonable modifications in the routing of the work and relocation of the equipment. This specifically refers to conditions where interference occurs or where materials cannot be installed because of structural or mechanical conditions encountered. The Contractor will receive no additional compensation for such work.

Ordinances

Work and materials shall be in full accord with the latest rules of U.S. Public Health Service, National Board of Fire Underwriters, O.S.H.A., local and state ordinances, State Accident Commissions Safety Ordinances, regulations of the Bureau of Fire Services and with prevailing ordinances.

Ordinances including building codes, gas codes, steam codes, and other codes applying to this contract shall be followed.

All applicable items shall conform to latest Standards Revisions established by the National Sanitation Foundations, (N.S.F.), Ann Arbor, Michigan.

Electric operated and/or heated equipment, fabricated or otherwise shall conform to the latest standards of National Electric Manufacturer's Association, Underwriters Laboratories, Inc., National Electric Code or local standards such as to be acceptable to authorities having jurisdiction.

Standard steam heated equipment shall be manufactured in accordance with A.S.M.E. code requirements and carry the A.S.M.E. stamp.

Burners for gas heated equipment shall be equipped with automatic lighters. Oven burners and other concealed burners shall have automatic safety pilots and conform to A.G.A. standards. All gas equipment is to be furnished with appliance pressure regulators.

The drawings and specifications shall govern whenever they require longer sizes or higher standards than are required by the ordinances.

The Ordinances shall govern whenever drawings and specifications require something which will violate the ordinances.

No extra change will be paid for furnishing items required by local and state ordinances not specified or shown on drawings. Rulings and interpretations of the enforcing agencies shall be considered as part of the ordinances.

Should any change in the drawings and specifications be required to conform to the above, the Architect shall be notified when bid is submitted.

After entering into contract, all necessary work shall be done to meet above laws, ordinances, Bureau of Fire Services requirements, etc., without additional expense to the Owner.

Samples

Samples of all hardware, locks, feet, brackets, and other materials that may be requested shall be submitted for approval before use.

Scheduling of Work

The work shall be scheduled so there will be no interference with work of other trades and so that it will cause no delay. A time schedule will be worked out for the entire building and this work shall keep pace with the set schedule, working nights, Sundays and holidays, if necessary, to complete the work within the time limit.

3. SUBMITTALS

All submittals to be reviewed, stamped and dated by FSEC prior to sending them to the Contractor, Architect and Consultant. Submittals not bearing the FSEC's stamp will be rejected.

FSEC shall submit required number of drawings, brochures and portfolios of all equipment, apparatus, materials, etc., which are applicable to this contract together with detailed specifications. Each piece of equipment, apparatus, and accessory to be checked by the FSEC to insure compliance with requirements of Architect's drawings and specifications and also brochures or any other item of information to be clearly marked for identification with respect to their application and installation locations. This specification page shall appear on every shop drawing.

Approval and/or review of shop drawings, details, and equipment by the Consultant is for design and concept only and does not relieve the FSEC of responsibility for compliance with design drawings, details and specifications, verification of all dimensions of equipment and building conditions and reasonable adjustments due to deviations.

While the Architect's drawings and specifications propose to be complete in all respects as to layout, type of equipment and materials, they are not intended to serve as detailed sleeve or insert drawings, and preparation of such drawings, required or necessary for this purpose, or to set equipment accurately, are to be the responsibility of the FSEC.

FSEC shall submit drawings of all custom fabricated equipment within thirty (30) days after notification of contract award. Drawings to be accurately laid out and correlated with other contractors work and latest architectural final construction plans. Equipment elevation shop drawings must be on 3/4" scale (3/4" = 1' 0").

Drawings to show detailed construction for each piece of equipment. Before submitting detail drawings for review, they must be checked by the FSEC with the specifications and shall show exactly how item will be fabricated. Construction of equipment shall not deviate from approved shop drawings without written approval from the Architect and/or Food Service Consultant.

FSEC shall submit rough in drawings for approval at a scale of 1/4" = 1' 0", locating accurately all utility connections for each item of equipment requiring the same. Rough in plan to be drawn up using final architectural building drawings. NOTE! All rough in connections to conform with normal acceptable standards. Rough in requirements for present or future food service equipment shall be included on all drawings.

FSEC 1/4" scale rough in drawings are to be dimensioned from ends of finished walls. Shop drawings with dimensions from centerline of columns will not be accepted, unless approval has been given by Architect, Consultant or the General Contractor.

Drawings showing all dimensions of bases or platforms and depressions to be submitted on a scale of 1/4" = 1' 0".

Rough in connection notes are not to be listed under numbered rough in schedule, except for general purpose outlets or where drawing space is limited.

Equipment rough in plans are to be furnished complete with layout plan and item schedule similar to food service consultants drawings. Plumbing, electrical, ventilation & depression plan, and base detail when required.

Plumbing and electrical plans are to be on separate sheets when drawings are prepared at 1/4" scale. NOTE! Food Service Consultants documents are not to be traced.

Manufacturers to strictly adhere to approved and reviewed drawings, except where field conditions require changes and in that event the Architect must be notified in writing.

Manufacturing of any equipment fitting between walls or between columns and walls to be withheld until actual field dimensions are set and approved by the General Contractor. All other items which do not require field dimensions are to be manufactured upon receipt of reviewed shop drawings.

Upon completion of contract, the contractor is to deliver to the Owner two (2) complete sets of final working drawings and two (2) portfolios of purchased equipment bound in a binder. A time schedule will be worked out for the entire building and this work shall keep pace with set schedule, working nights, Sundays, and holidays, if necessary, to complete the work within the time limit.

4. JOB CONDITIONS

Job Meetings

It shall be the responsibility of the FSEC to have a qualified representative at all monthly or special job meetings to help the Architect and other contractors on the job to correlate work or answer questions so that the job can progress without any obstructions.

Examination of Premises

FSEC to check the Architectural Contract Plans and visit the premises at a suitable time to determine maximum size of equipment he can safely get into the building in one piece. Field joints to be held to a minimum. Should door openings not be large enough, FSEC shall provide field joints in equipment as required and re weld inside of building.

Utilities Services

Rough in cold water, hot water, waste and vent piping, duct work and electrical wiring to be installed by Plumbing and Electrical Trades. Such items are to be brought away from surface of floors, walls and/or ceilings by these Trades and capped prior to installation of food service equipment.

5. GUARANTEE

FSEC is to furnish one (1) year written guarantee for equipment starting from date of acceptance by the Owner or the Owner's duly authorized representative. Guarantee to be in accordance with Architect's General Conditions.

Refrigeration Self-contained

All self-contained refrigeration compressors for milk coolers, ice cream cabinets, cold food counters, reach in refrigerators or freezers, etc., shall be furnished with a five (5) year compressor warranty and one (1) year refrigeration service starting from date of final acceptance.

6. PRODUCTS

Fabrication Requirements – See following page for details

All food service equipment is to be constructed in strict compliance with the latest standards of the National Sanitation Foundation and to meet all requirements of the local and State Health Regulations. All equipment to bear the N.S.F. seal of approval.

Welding

The words "weld", "welded", or "welding" as used in the item specifications, mean a metal joint continuously welded then all exposed parts ground smooth and polished to match adjoining surfaces.

All welding to be done in a thorough manner with welding rod of same composition as sheets or parts welded. Welds to be strong, ductile with excess metal and discoloration ground off and joint finished smooth to match adjoining surfaces.

Welds to be free of imperfections such as pits, runs, splatters, cracks, warping or discoloration. All welded joints to be homogeneous with parent metal itself. All fabricated equipment items where metal to metal butt joints occur to be joined and properly welded then ground and polished smooth.

Grinding, Polishing and Finishing

All exposed welded joints to be ground flush with adjoining material and neatly finished to harmonies therewith.

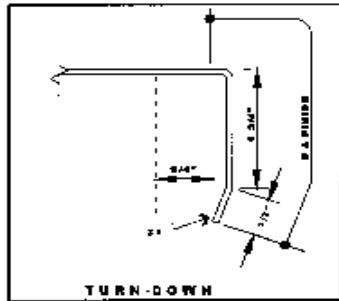
Whenever material has been depressed or sunken in by welding operations, such depressions shall be suitably hammered and peened flush with adjoining surfaces to then be polished and/or buffed to match adjoining surfaces to a degree consistent with good workmanship. Care shall be exercised in all grinding operations to avoid excessive heating of metal and metal discoloration. Abrasive wheels and belts used in grinding to be iron free and not having been used on carbon steel. In all cases, the grain or rough finish to be removed by successively finer polishing operations to be consistent with reasonable care and good workmanship. Final polishing operations to be uniform and smooth.

Where break band occurs, free of open texture or orange peel appearance, all such marks shall be removed by grinding, polishing and finishing. Wherever sheared edges occur, they shall be free from burrs, projections and fins to obviate all danger from cutting or laceration when hand is drawn over such sheared edges.

Where miters or bullnosed corner, they will be neatly ground to uniform condition and in no case will overlapping materials be acceptable.

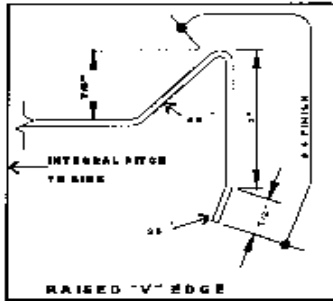
Equipment quality finish consistent with high grade of manufacturing practiced in industry. All exposed surfaces to be commercial mill finishes known as #4 satin finish for corrosion resistant steel. All exposed edges to be furnished with a #7 mirror finish, unless otherwise noted in item specifications.

All cabinets, doors and shelves where exposed to be interpreted as meaning inside surface exposed to view when swinging door or sliding doors are opened. Unless otherwise specified, underside of shelves need not be satin finish.



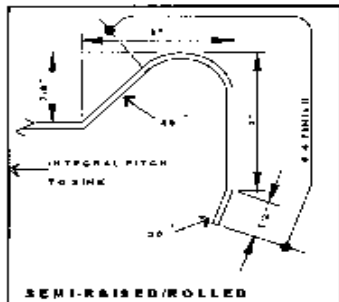
TURN-DOWN

TYPE "A" EDGE



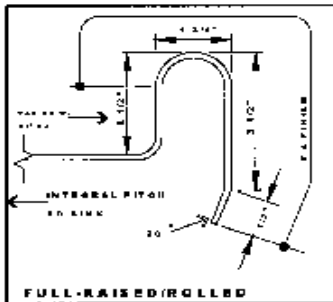
RAISED "V" EDGE

TYPE "B" EDGE



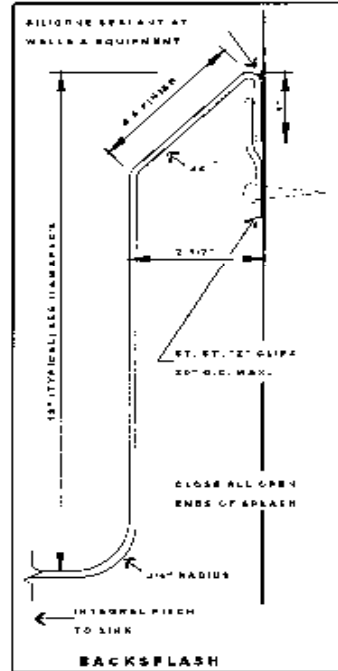
SEMI-RAISED/ROLLED

TYPE "C" EDGE



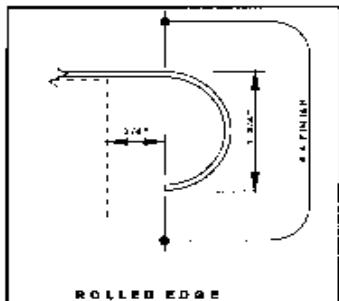
FULL-RAISED/ROLLED

TYPE "D" EDGE



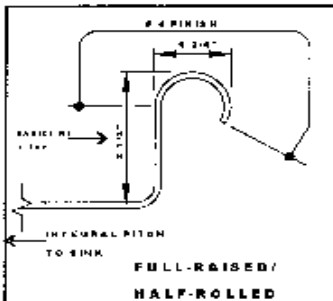
BACKSPASH

TYPE "G" EDGE



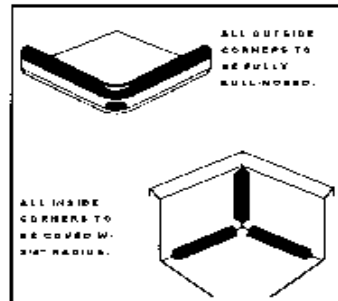
ROLLED EDGE

TYPE "E" EDGE



FULL-RAISED/
HALF-ROLLED

TYPE "F" EDGE



CORNERS

STANDARD EDGE DETAILS

NO SCALE

Doors Hinged

To be full height of door opening. Each door shall not be over 30" wide for high cabinets and 24" wide for low cabinets. Doors to be double pan construction flush type and braced and thoroughly sound deadened made of 18 ga. st. st. Inner and outer pans to be sealed with 3/4" long tack welds spaces

approximately 6" apart. Balance of the space to be completely sealed between tack welds with silver solder or N.S.F. approved hard solder (Silicone not approved).

All welds ground and polished smooth. All bracings to be on proper centers to fit door size.

Doors to be mounted on heavy semi concealed nickel bronze olive knuckle hinges fastened to inside ledge of door and cabinet so that only pin will be exposed to heavy st. st. piano hinges. Provide each door with Component Hardware #M22-2420.

Doors Sliding

Make same as specified for hinged doors, except they shall operate on Component Hardware #B58-5513 and #B58-5523 nylon tire wheels running on one (1) piece drawn aluminum overhead Component Hardware #B57 tracks. Bottom shall be guided by st. st. Component Hardware #B56-1096 guide pins at center of door openings. Provide locks where called for in item specifications. Provide flush type polished handles. (Heated cabinets with sliding doors to use Component Hardware #B58-5511 and #B58-5523 st. st. ball bearing wheels).

"High" type fixtures to be fitted with two (2) sets of doors in height, each set opening into half height of fixture.

"Low" type fixtures to be fitted with (1) set of full height doors. No door length to exceed 36".

Sinks

All sinks to be made of 14 ga. st. st. unless otherwise specified. All corners shall be coved at least 5/8" radius, with all corners and joints welded, ground and polished smooth to a #4 satin finish. Sinks, unless otherwise specified, shall not be less than 14" deep. The use of solder or separate filler pieces to obtain coved corners will not be acceptable. All sink bottoms are to be integrally pitched to insure complete drainage of sink to waste opening. Edges at table height to have exposed edges formed to match adjoining table. Edges adjacent to table to be welded to table with all welds ground and polished smooth.

Unless otherwise specified, all sinks to be provided with backsplash 12" high x 2 1/2" wide to allow for pipe space in rear. Flange over at ends, with top edge turned back 2 1/2" at 45 degree angle and down 1". Provide openings for combination swinging type water faucet for each compartment.

In sinks of two (2) or more compartments, furnish between each sink compartment a 3/4" wide full height portion integrally welded to sinks at front, back and bottom maintaining smooth 5/8" radius coved corners as described in preceding paragraph.

Front of multiple compartment sinks shall consist of st. st. apron same gauge as sinks having length same as overall length of sink bowls and same depth as bowls. This apron shall be "L" shaped and welded to or part of the top rim.

Design of apron front to be such that sinks shall have an appearance of a continuous one (1) piece front face of all overlapping joints and open spaces between sink compartments.

Each compartment to be furnished with Component Hardware rotary handle type drain, connected rear overflow, 6" tailpiece and faucet of make and model number as called for in Item Specifications. Also each sink to be furnished with 14 ga. st. waste handle bracket welded to underside of sink.

Tables & Tops Height

All working tops to be 34" high from floor, unless otherwise stated under specific item.

Metal Tops

Unless otherwise specified in Item Specifications, metal tops to be 14 ga. st. reinforced and braced on underside by framework consisting of 1 1/2" x 1 1/2" x 3/16" angles and 1" x 3" x 3/16" channels, galvanized where concealed and st. st. where exposed.

Framework angles to run full length and width and with angle crossbrace on not over 2' 6" centers. Channel reinforcing to run full length of tops down center of top. All tops with sinks shall be integrally pitched towards same.

All joints of framework to be welded with weld re-metalized. Tops to be bolted to framework in a concealed manner with st. st. bolts similar to AN-COR-LOX cup nuts. All metal tops to appear as one piece with all field and shop joints reinforced and welded, ground smooth, and polished, also to be made of largest piece obtainable.

No short pieces of metal will be acceptable. St. st. tops to have a #4 satin finish and all tops of this metal to be full 1/2" cove at re entrant corners, also where turned up in rear or in front, such as dishtables. Solder filled corners will not be acceptable.

Metal edges to be made as described below and/or shown on detail drawings. Top to have all edges turned down 1 3/4" then back 1/2" at a 70 degree angle all around with all corners welded, ground, and polished smooth with no cracks or openings showing. All exterior corners to be well rounded bullnosed in 1 1/4" radius.

Dishtables & Pot Washing Tables

All free edges to be turned up 2 3/4" then rolled to 1 5/8" x 180 degrees and furnished with apron edge front, as per Edge Detail Sheet. All exposed and exterior corners to be coved at 5/8" radius with all joints welded, ground, and polished smooth.

Where tables abut a wall or other tall equipment, extend back and/or ends up 12" then back 2 1/2" at 45 degrees and down 1" parallel to wall. Provide with end filler pieces and all welded surfaces ground and polished smooth.

The underside of Dish and Pot Washing tables to be reinforced with 1 1/2" x 1 1/2" x 3/16" st. st. angles and 1" x 3" st. st. channels. Angles to run full length of tops at both front and rear of tops with crossbrace front to back on 2' 6" centers. Channel bracing to run down center, full length of tops. Tops shall be integrally pitched to dishwasher and sinks.

Fastening Tops to Washers and Other Equipment

Where tops are shown adjacent to dish or glass washer, etc., ends are to be turned down 1 1/2" into fixture and bolted tightly to it with approved gaskets between body and turned down edges. Backsplashes to have edge against fixture turned out 1 1/2" and tightly fitted to it. Free edges to be neatly fitted to fixture corners to prevent water from dripping on floor. All tops to have integral pitch to drain towards dishwasher.

Dish & Pot Table Drainage

During installation of dish tables and dishwasher, FSEC shall water test all counter tops to make sure of proper pitch before final plumbing and electrical connections are made. All water on counter tops shall drain with no standing puddles allowed. Should the FSEC fail to pitch tables properly, he shall be responsible for disconnecting plumbing and electrical connections and re adjust tables to insure proper pitch. FSEC shall also be responsible for re connecting all service lines after tables have been re aligned.

Pipe Stands

All equipment requiring pipe legs or stands to be provided with sufficient supports to carry superimposed load of 100 lbs. per sq. ft. Top to be fabricated of 16 ga. st. st. Tubing to be Component Hardware #A46-5288 complete leg assembly Model Number 2236HB, 1 5/8" O.D., with st. st. hex head bullet shaped feet as previously specified. All pipe stands to be braced with crossrails, Component Hardware #A46-4288, 1 5/8" st. st. pipe welded to legs approximately 10" above floor or braced by lower shelf as specified hereinafter. Provide Component Hardware #A18-0206 st. st. gussets as previously specified, welded to framework on underside of top.

In place of gussets, st. st. legs may be welded to st. st. channels 5" long which shall fit into channel crossbracing. Flange of both channels to be machine bolted together. Holes for bolts to be slotted for adjustment. Provide legs on not over 5' 0" centers and additional if required or requested.

All pipe legs or vertical members to be set back from table top on ends and on front and back sufficient distance to offset any interference with workers, columns, walls or other items. Where tops are welded to sinks, omit pipe legs supporting top at sink location.

Shelves Under Tables

Under tops which are mounted on pipe legs or stands, shelves under table to be fabricated of 16 ga. st. st. with all edges flanged down 1 1/2" or as otherwise noted in the Item Specifications. Shelves to fit tightly around contour of legs and welded from underside. Shelves to be made up from long lengths with all joints welded, ground, and polished smooth.

Short lengths will not be permitted. Reinforced, as required, to support load of 50 lbs. per sq. ft. All sharp edges, burrs, and corners to be ground smooth and removed and then be slightly rounded. All shelves in cabinet bases are to be angle reinforced.

Cabinet Bases

Exterior cabinet bases to be constructed of 18 ga. st. st. with front face, exposed ends, rear, and corners integrally exposed with all welds ground and polished smooth to form a one piece construction appearance.

St. st. exterior to be mounted over a 1 1/2" x 1 1/2" x 1/8" all welded galvanized iron angle frame. Where st. st. exterior meets angle framework at drawer, door or shelf openings, exterior shall be turned in 1 1/2" over angle framework inside of openings. All drawers and doors to be flush with cabinet face.

All cabinet base bottoms to be enclosed with 18 ga. galvanized iron panels. Interior shelves of cabinet base to be constructed of 16 ga. st. st. and be reinforced with 1 1/2" x 1 1/2" x 1/8" angles. Rear and ends of shelves to be turned up 2" with all interior corners coved to 5/8" radius.

Drawers

Drawer front to be 3/4" thick double pan construction with 16 ga. st. st. telescoping rear panels. Joints to be sealed same as specified for double pan hinged doors. Drawer front fitted with recessed st. st. grip handle, Component Hardware #CAGP63-1012. Drawer to be furnished with 18 ga. galvanized iron

bottom with openings in front to accommodate drawer. Provide with cylinder type lock when specified under Item Specifications or shown on elevation details.

Opening in front to have edges turned in to fit drawer front which will be flush when drawer is closed. Bottom of enclosure to be open with edges turned in 1" on all sides.

All corners on enclosure to be continuously welded, then polished and ground smooth. Exposed rivets or screws will not be acceptable. Component Hardware #S81-2020 Drawer insert to consist of removable die stamped 18 ga. st. st. pan approximately 20" square x 5" deep. Top edges of drawer insert to be flanged out on all sides, not less than 1/2" for resting on drawer extension glides. All sharp edges and burrs to be removed from drawer flange.

Housing supports to be made of 12 ga. st. st. formed into angles welded to underside of metal tops or screwed to underside of wood tops and to extend full width of top with rear enclosure, where exposed. All welded items to be ground and polished smooth. Screws for wood tops to be st. st. countersunk. Drawer housings to slide on 14 ga. st. st. telescoping channels with st. st. rollers, Component Hardware #S52 series extension roller slides.

Drawers

This mechanism must be designed so that drawer will not tilt when fully opened. Provide with stop mechanism to prevent pulling the housing from slides but with suitable extension so it may be removed for cleaning.

Tier of Drawers

To be two (2) or three (3) in number of same size as specified for above and entirely enclosed with 18 ga. st. st. same as specified under cabinet bases with openings for drawers with all joints flush welded, grounded, and polished smooth.

Single drawers under table tops to be one inch (1") back of edge of fixture. All draws shall have front flush with cabinet body.

Fasteners

Exposed screw or bolt heads will not be permitted on fixtures. Rivets, if specified, shall be countersunk flush. Rivets to be same material as they join. Butt joints made by riveting straps under seams and then filling with solder or caulking will not be permitted or accepted.

Name Plates

All buy out equipment shall be furnished with a permanently affixed metal name plate listing manufacturer's name, model number, voltage, cycle, phase, horsepower, etc., in an easily readable location. Dealers, installers, fabricators or service agencies name plate stickers shall not be fastened to any item without the approval of the Architect or Consultant.

7. MATERIALS AND WORKMANSHIP

Unless otherwise specified, all material shall be new and of best quality, perfect, and without flaws and shall be delivered upon completion in an undamaged condition.

Stainless Steel

Shall be type 304 having a standard analysis of 18% chrome and 8% nickel. St. st. to be as manufactured by Republic Steel Company, "Endure", Allegheny Metal Company, Crucible Steel

Company, "Rezistal" or approved equal. Gauge to be specified under Item Specifications and furnished with #4 satin finish, unless otherwise specified.

Galvanized Iron

Shall be American Rolling Mills "Armco", Republic Steel, Inland Steel, "Tocan" or approved equal.

Pipe legs shall be Standard-Keil #2235HB, 16 ga. st. st. (0.65" thick), tubing furnished with st. st. adjustable foot and Standard-Keil #481 58 with enclosed gusset welded to underside of table top reinforcing channel.

Tubing to be seamless drawn, ground, and polished smooth to a #4 satin finish. Bottom of legs to be swedged for close fit to adjustable foot. Where space permits furnish 1 1/4" dia. st. st. crossrails welded to leg uprights. All welds shall have radius corners and be ground and polished smooth to a #4 satin finish.

Handles, Hinges & Door Fasteners

All hardware and other fittings used in connection with the equipment to be cast nickel bronze or st. st. Handles to be welded or bolted to the equipment in a concealed manner. Bolts to be st. st. and hinges to be recessed in door with st. st. Component Hardware #M75-I002 lift-off, N.S.F. approved hinge. Hinges to be fastened in place with st. st. recessed rivets or welded in place with weld ground and polished smooth.

Sliding doors to be depressed type and furnished with Component Hardware Model #P62-1010 handles. Hinges to be olive knuckle, semi concealed type of nickel bronze or st. st. piano type as described under the specific item.

Painting and Coating

All metal that is not st. st. is to be painted with two (2) coats of an approved rust proof paint such as Rustoleum or other approved equal of highest quality gray enamel.

Electric Receptacles

All 120V-1 phase duplex receptacles in cabinet bases to be Pass & Seymour Model #6307 and receptacles over 120 volt shall be Hubbel receptacles sized as per the rough in drawings.

All receptacles are to be grounded type being both dust and moisture proof. Furnish outlets with st. st. face plates and neoprene mats. In cabinet bases, all receptacles are to be mounted in Chase #R-1 all coved corners st. st. recessed type enclosure mounted to cabinet base. Component Hardware #R73 - 1210 receptacles shall be pre wired by FSEC to junction box in bottom of base cabinet left ready for final connection by Electrical Trades. All wiring between receptacles and junction box to be run in rigid conduit.

All counter top receptacles to be Component Hardware #R58 chrome plated type as specified in Item Specifications. Counter top receptacles to be pre wired to junction box in rigid conduit same as previously specified. All wiring to be in strict compliance with latest standards of the National Sanitation Foundation and Board of Health Requirements.

Quietness of operation of all food service equipment is a requirement and the FSEC shall be required to remove or repair any equipment producing objectionable noises.

Shop Drawing Review

All submittals to be reviewed, stamped and dated by FSEC prior to sending them to the Contractor, Architect and Consultant. Submittals not bearing the FSEC's stamp will be rejected.

By reviewing and submitting shop drawings and samples, the FSEC thereby represents that he has verified all construction criteria, materials, catalog numbers and similar data and that he has checked and coordinated each shop drawing and sample with the requirements of the work and of the contract documents.

If shop drawings and/or samples are submitted without proper identification and in the Consultant's opinion it is evident that they have not been properly reviewed by the FSEC or if shop drawings are submitted in an unprofessional manner, they will be returned to the FSEC for identification and/or review and re submission. In such an event, it will be held that the FSEC has not complied with the above requirements for reviewing and identifying shop drawings and samples. The FSEC shall bear the risk of all delays in work or in work of any other trade, the same as if no shop drawing or samples had been submitted. The above requirements will be strictly enforced.

The Consultant will review and process only two (2) submissions of each shop drawing and/or sample. Shop drawings and samples returned because the FSEC has not complied with the above requirements shall be counted as the first submission. If more than two (2) submissions are required, the FSEC shall pay the Consultant's cost for reviewing and processing the third and subsequent submissions. (Which will be so identified by the Consultant when returned to the FSEC)

The Consultant's cost shall be computed at two and one half (2 1/2) times payroll plus reproduction and mailing expense.

Buy out Booklets

By submitting prepared Buy out Booklets, the FSEC thereby represents that he has determined and verified voltage and phase requirements and that he has checked and coordinated each item with shop drawings and contract documents.

Each item in the Buy out booklet shall have a typed title page, complete with descriptive details and included accessories.

TITLE PAGE TO BE AS PER THE FOLLOWING PAGE.

8. EXECUTION

Inspections

The Owner, Architect, and/or their duly authorized representative shall have free access to the contractor's shop or shops during the construction of this equipment for the purpose of making inspections to see that the plans and specifications and detailed drawings are being adhered to carefully.

Contractor shall correct any errors found during the inspections, to the extent within the scope of the plans, specifications and detailed drawings.

Upon being notified of job completion, it shall be the responsibility of the Food Service Consultant to inspect the job site and prepare an itemized Punch List.

SAMPLE TITLE PAGE

Food Service Equipment Contractor _____

ITEM # _____ QUANTITY _____

Description: _____

Electrical

Motor H.P. _____ Volts _____ Phase _____ Cycle _____

Heating Element: KW _____ Volts _____ Phase _____

Lighting and/or Fan Circuit: _____ Volts _____ Phase _____

Refrigeration specs.

Plumbing

Cold Water _____ 140 degree water _____ 180 degree water _____

Steam in _____ Steam Pressure _____ Pounds _____

Steam Return _____ Connected Waste _____ Floor Waste _____

Gas

Kind _____ Size _____ B.T.U. _____

Spec. Gravity _____ Pressure _____

Direction of Feed for Dishwasher

Right to Left, Left to Right, Straight Thru, Corner type, Clockwise, and Counter Clockwise (circle unit required).

Door Hinged

Right Side, Left side (Circle unit required).

If items are found not to be complete per approved drawings, General Requirements and the Consultant's Item Specifications, upon receiving the Punch List, the FSEC shall correct all items on the list within thirty (30) days.

It shall be the responsibility of the Plumbing and Electrical Trades to check all rough in connections installed by their personnel to make sure that they agree with the dimensioned

FSEC shall verify with the Electrical Trades the voltage and phase required for each piece of equipment that is to be supplied. Should the FSEC fail to verify the voltage characteristics it shall be his responsibility for changing the equipment on the job site to fit the voltage on the site.

When deemed necessary by the Architect or the Consultant, the FSEC shall meet on the job site with the Electrical and Plumbing Trades to determine the best way of offsetting rough in connections that interfere with beams, foundations or other possible field obstructions.

The FSEC shall check all base sizes, after installation by the Architectural Trades, to make sure that they will fit his equipment. Should base be installed incorrectly, the FSEC shall advise the Architectural Trades in writing at once to have base corrected as required.

The FSEC shall check all walls where equipment abuts or fits between, after installation by the Architectural Trades, to make sure that the equipment will fit correctly.

9. PREPARATION

All gas equipment is to be furnished with appliance pressure regulators. Electrical requirements shall be in accordance with rough in plan and verified on the job site.

Should the electrical requirements and the item specifications not agree with the rough in plan or electrical requirements on the job site, it shall be the responsibility of the FSEC to send a written report to the Architect and Consultant advising them of the discrepancy. Should the FSEC fail to verify voltages on the job site, it shall be his full responsibility to make all necessary changes on his equipment at no cost to the Owner.

All measurements shall be verified at the building site and full responsibility for their correctness must be assumed by the Contractor.

No extra charge or compensation will be allowed on account of difference between actual dimensions and the measurements indicated on the drawings. All or any differences which may be found shall be submitted to the Architect for consideration before proceeding with the work.

10. INSTALLATION

Food Service Equipment

FSEC shall be responsible for assembly and erection of all equipment included herein and in required location as shown on drawings, leaving same with outlets for other contractors to make final steam, plumbing, electrical and ventilation connections.

FSEC is to provide a competent foreman to supervise the erection and placing of equipment and to advise other Trades in regards to connections at time of installation. Where applicable, he shall deliver to other Trades all plumbing, steam fittings, and electrical parts included with his equipment for their proper installation.

FSEC to have qualified personnel on job site while the Plumbing, Electrical, and H.V.A.C. Trades are making final connections between rough in and equipment. Where necessary, FSEC is to move equipment to allow these Trades to make final connections.

Should the FSEC fail to assist the other Trades and final location of equipment is incorrect, it shall be the responsibility of the FSEC to move the equipment to correct location and assume the cost of disconnecting and reconnecting the service connections.

FSEC is responsible for cutting all holes thru tops, backsplashes, shelves and cabinets so the other Trades can make final connections to outlets in fixtures from his rough in.

Should these Trades fail to check rough in before slab is poured, they shall assume all responsibility for making necessary changes and paying all the costs involved. Should the dimensioned rough in drawings be incorrect, it shall be the responsibility of the FSEC to assume costs involved for revising all connections involved in the dimensioned error.

FSEC shall verify with the Electrical Trades the voltage and phase required for each piece of equipment that is to be supplied. Should the FSEC fail to verify the voltage characteristics it shall be his responsibility for changing the equipment on the job site to fit the voltage on the site.

When deemed necessary by the Architect or the Consultant, the FSEC shall meet on the job site with the Electrical and Plumbing Trades to determine the best way of offsetting rough in connections that interfere with beams, foundations or other possible field obstructions.

Rough in Inspections

It shall be the responsibility of the Plumbing and Electrical Trades to check all rough in connections installed by their personnel to make sure that they agree with the dimensioned rough in drawings as prepared by the FSEC.

Should these Trades fail to check rough in before slab is poured, they shall assume all responsibility for making necessary changes and paying all the costs involved. Should the dimensioned rough in drawings be incorrect, it shall be the responsibility of the FSEC to assume costs involved for revising all connections involved in the dimensioned error.

FSEC to have qualified personnel on job site while the Plumbing, Electrical, and H.V.A.C. Trades are making final connections between rough in and equipment. Where necessary, FSEC is to move equipment to allow these Trades to make final connections. Should the FSEC fail to assist the other Trades and final location of equipment is incorrect, it shall be the responsibility of the FSEC to move the equipment to correct location and assume the cost of disconnecting and reconnecting the service connections.

FSEC is responsible for cutting all holes thru tops, backsplashes, shelves and cabinets so the other Trades can make final connections to outlets in fixtures from his rough in.

Should specified equipment arrive at the job site with incorrect finish, model number, damaged, etc. A replacement item must be ordered immediately. Should the project schedule require the incorrect unit for opening operation, existing unit is to be left in operation until replacement is available, at no cost to the owner. It shall be the responsibility of the FSEC to assume all costs for re stocking, re selling, etc., of the incorrect items that have been used by the Owner.

All holes or openings must be cut in a workmanlike manner, with all edges ground and polished smooth and free of sharp edges. Opening in rear of base cabinet must not be larger than 1" bigger than pipe extending thru cabinet. Oversize cutouts with rough edges will not be approved.

All faucets and waste assemblies to be furnished by the FSEC and to be turned over to the Plumbing Trades for their installation. NOTE! Faucets and waste assemblies to be tagged properly to insure proper installation of these items on the correct fixtures.

Ventilating Trades

This Trade will furnish all ductwork to openings on top hoods, furnished by the FSEC.

Electrical and Plumbing Trades

These Trades shall furnish all final electrical and plumbing connections between fixtures and rough in outlets in walls or floors.

Internal connections on booster heater and disposer to be furnished by the Plumbing and Electrical Trades and proper installation of these above named items. FSEC shall also include detailed drawings showing proper location of all accessories. General Building Contractor shall furnish all masonry platforms, tile bases and floor depressions.

Trimming & Sealing Equipment

Space between units to walls, ceilings, and floors and adjoining units not portable and with enclosed bodies, shall be completely sealed against entrance of food particles or vermin by means of st. st. trim strips, welding or commercial joint material suitable to the nature of the equipment. Sealer when not exposed to extreme heat shall be silicone construction sealant in the appropriate color. Ends of hollow sections to be closed. Enclosed fixtures without legs mounted on masonry bases or floor shall be sealed watertight to base of floor.

All equipment setting on masonry bases will be constructed to overhang to provide toe spaces, however, metal framework and/or housings are to be turned under a sufficient distance to overlap masonry base and eliminate openings at these points. Bases to be sealed with Dow Corning sealant #786 or approved G.E. sealant.

Caulking at all backsplash areas in pot washing, dishwashing and preparation sinks and counters shall not have any recessed or convex areas which will allow for debris and water to sit on caulk.

Upright penetrations in backsplash and counter tops to have gap sealed with silicone.

11. ADJUST & CLEAN

FSEC shall adjust and lubricate all moving parts for smooth quiet operation. The FSEC shall touch up scratches, marred or abraded surfaces to restore equipment to the original condition.

The FSEC shall also remove all crating and packing material from the job site and shall also remove fingerprints and leave equipment and adjacent equipment or surfaces clean.

The FSEC shall be responsible for missing items unless he can produce signed receipts from the Owner's personnel that the items were received and accounted for. Owner cannot be responsible for items that were dropped off at the job site and were not signed for by the Owner's personnel or representatives.

12. DEMONSTRATION

The FSEC shall arrange a demonstration date with the Owner and at the same time check out all loose items with the Food Service Manager. Copy of signed receipts shall be mailed to E. F. WHITNEY, INC., showing all loose items, such as st. st. pans, mixer attachments, etc.

13. GUARANTEE

All items furnished by the Food Service Equipment Contractor as part of this Contract, shall be guaranteed against defects in workmanship and material for a period of one (1) year.

Manufacturers of standard items of equipment as supplied under this Contract are to provide a one (1) year warranty on parts and labor.

In addition, connected pieces of equipment requiring calibration are to be so calibrated by a qualified person as part of this Contract.

Commencement date for warranty purposes is as follows:

- a. Connected equipment: - When equipment is started up for intended use.”
- b. Non-connected equipment: - At date of Owner acceptance.”

14. PROTECTION OF EQUIPMENT

Fabricated fixtures such as custom st. st. & plastic laminate items are to have fiberboard or plywood taped to tops and exposed body panels. Protective covering is to be left in place until all trades are completed.

Manufactured equipment is to have fiberboard or plywood tape as required per equipment shape and installation access requirements.

Prohibited use of equipment; tool and material storage area, workbench, scaffold, stacking area, etc.

15. APPROVED CUSTOM ST. ST. FABRICATORS

The following is a list of fabricators who have demonstrated the ability to provide quality equipment.

Florida Stainless
Oviedo, FL

American Stainless Steel Corp
Englewood, CO.

PRS
Warren, MI

Great Lakes Stainless
Traverse City, MI

MCM Fixture Co.
Hazel Park, MI

Midwest Stainless Fabricating Co.
Livonia, MI

Nationwide Fabrication, Inc.
Northglenn, CO

Stainless Fixtures Inc.
Pomona, CA

Use of a food service equipment fabricator other than those listed must be specifically approved in writing by the consultant prior to submission of food service equipment bids on this project.

ITEM # 1 WALK IN REFRIGERATOR/FREEZER

QTY: One (1)

MFG: AMERICAN PANEL

CONST:

Walk-In Refrigerator/Freezer provided under this portion of the specifications shall be prefabricated of modular design and construction. They shall be constructed to allow convenient and accurate field assembly. See Sheets FSE-8, 9 & 10 for additional details.

Panel Construction - All panels shall consist of interior and exterior metal surfaces precision formed to exact dimensions with double 90° edges to enhance overall panel rigidity. The finished metal surfaces shall be fitted with a teardrop profile gasket and placed in precision tooled fixtures where they are injected with *Foamed-in-Place* urethane insulation. Curing of the insulating core shall take place at a controlled temperature within the foaming fixture to provide permanent adhesion to the metal surfaces, allowing for uniform foam expansion and to maximize finished panel strength. Panel edges shall have a molded urethane tongue and groove profile of insulation factor equal to core material to accurately align panels during installation and to assure an airtight seal. No structural wood, steel, straps, high density urethane or other non-insulating materials shall be used in panel construction. Finished panels must be UL classified building units.

Finished panels will be 4" thick and will be provided in 11 ½", 23", 34 ½" and 46" widths to conform to project drawings. Corner panels shall be one piece 90° angled construction and shall measure 12" x 12" or 12" x 6 ¼" where required. For units with multiple compartments, specially designed "tee" panels shall be provided to form partition wall to outside wall junctures. "Tee" panels shall measure 23" x 12" or 23" x 6 ¼" where required. All panels shall be interchangeable with like panels or standard door frame sections for fast and easy assembly.

Floor Construction and Finish - Wall panels shall be set into a 7" deep depressed floor area arranged so that finished interior floor will be level with the finished building floor. After walls are set, building slab within each insulated area shall be covered with polyethylene film forming a vapor barrier. American Panel to provide two (2) layers of 2" board urethane and ethylene slip sheet. Quarry Tile, Concrete or epoxy finished wear surface and coved base to be provided by General Contractor.

Door Construction - Entrance doors are constructed similar to other panels and shall be flush mount, magnetic in-fitting type. Door sections shall be constructed to conform to Underwriters Laboratories Standards for electrical safety and shall bear all appropriate U.L. listing labels. The perimeter of the door and frame shall be built of a fiberglass reinforced plastic (FRP) pultrusions weighing not less than 11 ounces per lineal foot. All pultrusions shall be non-conductive, non-corrosive, rust proof and listed by the National Sanitation Foundation. Door jamb shall house a door frame heater circuit and a magnet attracting stainless steel trim strip. Door frame shall be equipped with flexible bellows type vinyl door gasket with magnetic core and flexible EPDM (ethylene propylene diene monomer) door sweep. Standard door frame sections 46", 57 ½" or 69" wide shall be equipped with a vapor proof light fixture and globe pre-wired to a pushbutton type light switch with pilot light and a 2 1/2" diameter dial-type thermometer. An aluminum braided heater wire with integral circuit closure providing activation while refrigerated room is within operating temperature and a 16 gauge stainless steel threshold plate shall also be included in all door frames.

Door hardware shall be die cast zinc with brushed satin finish. Doors shall be mounted with two (2) heavy duty cam lift hinges. Pull handle assembly shall incorporate a keyed cylinder deadbolt style lock, provision for owner supplied padlock and an inside safety release to prevent personnel entrapment. Positive door closing and sealing shall be assisted by a hydraulic closer device.

Per code, provide clear vinyl strip curtains at door openings.

ACCESSORIES:

3-Way Switch: Provide, as required, 3-way toggle switches with pilot lights to allow interior walk-in lights to be controlled from two entrances.

View-Through Window: To provide vision in the walk-in room, a 14" x 14" triple-pane window shall be used with a heated frame as standard. For freezer applications or humid conditions, heated glass shall be used. Window shall be neatly trimmed and designed for replacement in the field.

Monitoring System: fully programmable **WALK-IN MONITORING SYSTEM 100** featuring audio/visual temperature alarm with digital thermometer, high & low set points, 115V output, energy saving door frame heater wire, vapor proof light & switch with pilot light.

Cylinder Lock: A cylinder locking device shall be installed on reach-in doors as required. It shall consist of a cylinder lock and locking cam with a non-conductive housing.

Thru-Ceiling Electrical: A thru-ceiling electrical assembly shall be supplied at the entrance door to allow the door electrical components to be pre-wired through to the exterior ceiling. It shall consist of a flexible cord with plug on the door section and receptacle installed in the ceiling panel.

Kickplate: Provide 1/8" aluminum diamond kickplate on interior and exterior of all entrance doors. Kickplate to be 36" high x width of door.

Provide 48" long LED ceiling mounted light fixtures in each compartment. Exposed conduit on interior ceiling is not permitted. FSEC to be responsible for installation of light fixtures. Loose box of fixtures turned over to electrical trades is not acceptable. FSEC to mount lights and leave ready for interwiring and final connections to switch(s) and building power supply by electrical.

NOTE! Per code, The light intensity shall be at least 110 lux (10 foot candles) at a distance of 75 cm (30 inches) above the floor, in walk-in refrigeration units, dry food storage areas and in other areas during periods of cleaning. American Panel to provide fixture quantities to meet these requirements.

Wall Protectors: To prevent damage to Walk-Ins in heavy traffic areas, the following bumper rail shall be supplied on the exposed walls:

A 1-1/2" wide extruded aluminum rail with vinyl insert. Field mounted with unexposed with sheet metal screws/supplied with end caps.

Closure Panels: Furnish removable closure panels to enclose the area between the building and the walk-in ceilings. Panels to be fabricated of same material as walk-in exterior.

Trim Strips: Furnish trim strips between walk-in and building walls where shown. Constructed and finished of same material as exterior of walk-in.

Corner Guard: Provide 16 gauge stainless steel corner guards 6" x 6" x 60" high on exposed exterior corner of walk-in.

Base Cove: General Contractor to provide base cove, where specified, to seal walk-in to building floor and facilitate easy cleaning.

One (1) Lot exterior wall bumpers where exposed
One (1) Lot of LED lights at doorway
One (1) Lot of 48" LED Tube Light Fixtures on ceiling
Two (2) Flex Strip Curtain
One (1) Heated Pressure Relief Vent Model 1825

Two (2) Vision Windows 14" x 14"

DETAILS:

Finishes - The interior and exterior finish on panel surfaces is to be manufactured from a combination of the following premium grade materials. The gauge or thickness of the metal material listed is rated prior to embossing.

- Interior walls shall be .032. Stucco Aluminum
- Interior ceilings shall be .032. Stucco Aluminum
- Exposed Exterior walls shall be .032. Stucco Aluminum
- Exterior ceiling shall be .032. Stucco Aluminum
- Exposed Exterior Front shall be 032. Stucco Aluminum

Insulation - Insulation shall be 4" thick high pressure impingement mixed (HPIM) foamed-in-place urethane, minimum 2.4 lb. per cubic foot density, fully heat cured and bonded to metal finishes. The insulation shall be manufactured using an HFC 245fa expanding agent. The thermal conductivity ("K" factor) shall not exceed 0.133 BTU/Hour/Square Foot/Degree Fahrenheit/Inch of Thickness across the entire width of the panel. Overall coefficient of heat transfer ("U" factor) shall not exceed .033 and the resistance to heat penetration ("R" factor) shall not be less than 30. The insulation shall have a 97% closed cell structure to prevent absorption of liquids. The finished panel (not just the core material) shall be listed by Underwriters Laboratories as a Class 1 (UL-723) building unit and demonstrate a flame spread rating of 20 or less. The core material smoke developed Underwriters Laboratory rating shall be no greater than 300 as documented by and in accordance with ASTM Standards.

Panel Assembly - Assembly of walk-in shall be accomplished by the use of cam-action locking mechanisms precisely positioned along the outside tongue or groove edges of each panel to exactly correspond with a matching mechanism in the adjacent panel. Cam lock spacing on vertical joints shall not exceed 46" and at junction of vertical and horizontal joints by 23". Cam locks shall be foamed-in-place and anchored securely in the panel by steel "wings" integral to the lock housing. Cam locks shall be operated through access ports by the use of a hex wrench, thereby, pulling the panels together and establishing an airtight seal. All access ports shall be located on the walk-in interior to facilitate assembly when close to building structures and shall be covered by vinyl snap-in caps after final assembly. Complete step-by-step assembly instructions and erection drawings shall be supplied by the walk-in manufacturer and installing contractor must be factory authorized!

Walk-In Monitoring System 100 (WIMS-100) – System to have a five digit LED display with high and low alarm set points with audible and visual alerts for alarm conditions. All functions shall be programmable and accessible from the face of the controller. System to display freeze and refrigerator temperatures in alternating pattern.

System shall have an integrated, push button light switch with on/off indicator light. System shall comply with Jan 1, 2009 federal energy requirements by incorporating an automatic lighting shut-off. System shall actively monitor and control door heater assembly for proper operation and lower energy consumption by having programmable initiation temperature, termination temperature and percentage of operation time adjustability.

System to have 115V output for connection to external alarms, dialers, etc. that run on standard 115V input. Where specified, the system shall be supplied with a dry contact kit for connection to equipment that requires dry contacts.

Warranty - Insulated panel products are to be warranted for a period of ten (10) years after date of installation to the original user should the panels be installed properly and be used under normal service conditions. Installing contractor is to closely adhere to manufacturer's recommendations and guidelines

for installation so as to ensure a quality operating product. All accessories and components shall have a one year warranty.

Refrigeration System - All system field connections shall be made by a licensed refrigeration contractor (as a subcontractor to the kitchen equipment contractor) that is certified in refrigerant recovery. Condensing units shall be preassembled remote, fully hermetic, air cooled units for outdoor installation as manufactured by Copeland or Tecumseh and shall be supplied with matching Russell evaporators. Condensing units shall be equipped with PSC fan motors and evaporator fans shall utilize the ECM type fan motors. Manufacturer is to calculate heat loads and provide systems with a minimum of 105% of needed capacity to maintain holding temperatures of 35° F in coolers and -10° F in freezers. Calculations shall take into consideration box ambient, refrigeration system ambient, air flow, exposure to sunlight and altitude. Interconnection of refrigeration lines, insulation and electrical wiring shall be accomplished by the appropriate trades and shall be a portion of the kitchen equipment contract.

Systems to consist of the following water cooled units.

3.5 HP hermetic air cooled refrigeration system -10° F Freezer 208/230/60/3 Includes an electric defrost evaporator coil Includes 5-Year Compressor Warranty Condensing Unit Model # AVA2515ZXTXC (2B3145-9) Evaporator Model #: LET-090

1.00 HP hermetic water cooled refrigeration system 35° F Cooler 208/230/60/3 Includes standard evaporator coil Includes 5-Year Compressor Warranty Condensing Unit Model # M6KP-0116-TAC-021 evaporator Model #: ADT090

Note! FSEC to verify makes and model numbers to insure proper operation and connection loads. Units to be installed on roof area in location as determined by architect. FSEC to verify distance at time of bidding to insure proper system sizing.

Refrigeration Warranty - All parts shall be warranted for one year from date of installation with an additional four (4) year compressor warranty added by the manufacturer. A one year labor warranty of the system is to be provided by the licensed installation contractor as a subcontractor to the kitchen equipment contractor.

NSF: All Walk-Ins shall be fabricated to comply with National Sanitation Foundation Standard No. 7. The NSF label shall be affixed to the interior door pan. Interior corners and floor shall be coved to meet NSF specifications.

Submit shop drawing for review and approval.

ITEM # 2 REFRIGERATOR CONDENSING UNIT

One (1) Unit included with item #1.

ITEM # 2.1 REFRIGERATOR BLOWER COIL

One (1) Unit included with item #1.

ITEM # 3 FREEZER CONDENSING UNIT

One (1) Unit included with item #1.

ITEM # 3.1 FREEZER BLOWER COIL

One (1) Unit included with item #1.

ITEM # 3.2 HEAT TAPE

One (1) Lot furnished and installed by FSEC.

ITEM # 4 STORE ROOM SHELVING

QTY: Nine (9)

MFG & MODEL: InterMetro Industries Corp Super Brite Super Erecta Shelving

CONST: All carbon steel construction. Shelves to have 10 ga. mat wires spaced 21/32" apart. Mat wires to be supported by 6 ga. support wire. Support wire spacing specific to shelf size. Shelf width greater than 18" include one to two 7 ga. snake wire supports running the length of the shelf. Shelf frame to be made up of 7 ga. snake wire with two 6 ga. snake support wire. A round 1 1/2" steel collar is welded at each corner. All contact points are to be welded.

Posts are to be provided as 1" O.D. Round tubes notched every 1" of the post. A polypropylene post cap will be installed on the top of each post. The bottom of the post to have F04-004 hex head leveler and C03-002 post insert for the purpose of leveling the shelving.

Finish will be Super Brite, a zinc based chromate bath.

DETAILS: Each shelving to be furnished five (5) tiers high with four (4) 86" high posts. Shelving size and quantity to be sized per plan. Shared uprights will not be accepted.

ITEM # 5 RACK, PAN

Three (3) ADVANCE TABCO model #PR20-3W. Units to be front load all welded portable pan rack. Unit to be furnished per manufacturers standards. Include heavy duty casters, two with locks.

ITEM # 6 PORTABLE STORAGE SHELVING

QTY: Seven

MFG/MODEL: InterMetro Industries Corp Super Brite Super Erecta Shelving

CONST:

All carbon steel construction. Shelves to have 10 ga. mat wires spaced 21/32" apart. Mat wires to be supported by 6 ga. support wire. Support wire spacing specific to shelf size. Shelf width greater than 18" include one to two 7 ga. snake wire supports running the length of the shelf. Shelf frame to be made up of 7 ga. snake wire with two 6 ga. snake support wire. A round 1 1/2" steel collar is welded at each corner. All contact points are to be welded.

Posts are to be provided as 1" O.D. Round tubes notched every 1" of the post. A polypropylene post cap will be installed on the top of each post.

Finish will be Super Brite, a zinc based chromate bath.

ACCESSORIES:

The bottom of the post to have heavy duty casters, two with locks.

DETAILS:

Each shelving to be furnished five (5) tiers high with four (4) 86" high posts. Shelving size and quantity to be sized per plan.

ITEM # 7 CART, UTILITY

Five (5) LAKESIDE model #522 NSF Approved st. st. utility cart. Unit to be furnished per manufacturers standards.

ITEM # 8 RACK, DUNNAGE

Five (5) CAMBRO model #DRS480 slotted top dunnage rack sized 21" deep x 12" high x 48" long per plan.. Unit to have 3000 pound capacity. Provide units in speckled gray

ITEM # 9 PORTABLE ST. ST. TABLE

One (1) ADVANCE TABCO model # SS-246 st. st. work table furnished per manufacturers standards. Unit to be provided with the following:

- One (1) 34" high table height (ADA)
- One (1) St. St. Undershelf
- Four (4) St. St. Legs with heavy duty casters, two with locks.

ITEM # 10 RACK, DUNNAGE

Three (3) CAMBRO model #DRS600 slotted top dunnage rack sized 21" deep x 12" high x 60" long per plan.. Unit to have 3000 pound capacity. Provide units in speckled gray

ITEM # 11 PORTABLE WALK IN REF/FZR SHELVING

QTY: Ten (10) per plan

MFG/MODEL: InterMetro Industries Corp SUPER ERECTA WITH METROSEAL3 SHELVING

CONST: Shelves to have # 10 gauge mat wires spaced 2 1/32" on centers with #6 gauge cross braces a maximum of 8" on centers and running perpendicular to crosswires. Additional center cross bracing is augmented with 1/4" snake wire support on shelves with depth 21" and greater. Side construction to consist of 1/4" diameter top and bottom support wires with 7 gauge snake wire welded between the top and bottom support wires. The top and bottom support wires are to be welded to round 1 1/4" i.d. collar to form corner. All contact points are to be welded.

Posts are to be provided as 1" O.D. round tubes grooved at 1 " increments and numbered at 2" increments. Posts are double-grooved every 8" for easy identification. A round plastic post cap will be installed on the top of each post. A slip sleeve will be provided for each collar to stay at selected position on the post.

The finish will be Metroseal3, a proprietary applied electrostatic process over a self-sealing hydrated base layer. Metroseal3 contains Microban, which is an antimicrobial product which inhibits the growth of bacteria.

ACCESSORIES:

One (1) Set of 5" dia., swivel casters, 2 with locks to be provided with each section of shelving.

DETAILS:

Shelving to be furnished four (4) tiers high with One (1) set of 70UPK3 posts per unit. Post sized to allow mobile units to be rolled in and out of 75" doors while on 5" casters. FSEC to coordinate shelving length with walk in interior to insure proper fit.

ITEM # 12 EXISTING FOOD PROCESSOR

One (1) Existing unit provided by owner. "NIC"

ITEM # 13 ST. ST. WORK TABLE W/ SINK

One (1) Custom fabricated unit, sized 11' - 0" long x 30" wide x 34" high.

TOP: Fabricated of 14 gauge stainless steel with type "A" edges on all open sides. Top to have bullnosed corners with No. 4 finish and reinforcing angles/channels under, per General Requirements.

DRAWERS & ENCLOSURE: Under top, furnish tier of three (3) 18 ga. st. st. drawers each 20" x 20" x 5" deep. Drawer inserts to be removable type with roller bearing extension slides, double pan construction drawer fronts and 18 ga. st. st. cabinet enclosure constructed per General Requirements. Base of unit to be mounted on Standard-Keil #1072-0641-1755, 6" high st. st. adjustable legs.

CYLINDER LOCKS: Each drawer to be furnished with Standard-Keil #1210 Cylinder Locks installed per Manufacturer's recommendations. All drawer locks to be keyed alike on entire job.

SINK: In top per plan furnish integrally welded sink 21" x 21" x 12" deep. Sink fabricated of 14 ga. st. st. with horizontal and vertical corners with not less than 5/8" integral radius. Sink bottom to be pitched to drain towards 3 1/2" dia., die stamped opening. Sink to be polished out in all corners to a #4 finish.

SINK TRIM: One (1) T&S Model B-0220-LN deck type faucet furnished with 060X, 8" swing spout with B-0199-01 aerator. Faucet caulked watertight to counter top. Faucet to be cast red brass, all chrome plated with color coded hot and cold water faucets.

One (1) One (1) T&S Model B-3950-01 Twist Handle Drains with connected rear overflow & 010387-45 removable basket strainers

SINK ENCLOSURE: Cabinet base under sink section furnished with 18 ga. st. st. louvered access door. Door to be double pan construction, sound deadened, with Standard Keil N.S.F. hinges and recessed st. st. handles per General Requirements. Bottom of sink enclosure, to be furnished with removable 16 ga. st. st. shelf, coved interior corners with rear and ends turned up 2" against cabinet interior. NOTE! shelf to be held back 8" from rear of cabinet to allow space for water and waste rough in connections.

ELECTRICAL: Per rough in plan furnish duplex receptacle recessed as shown on electrical plan. Junction box to be located below drawer enclosure. See electrical plan for outlet locations.

Receptacle to be duplex unit Pass & Seymour model #6307 set in Standard-Keil #2773 stainless steel recessed receptacle holder. Include Pass & Seymour neoprene mat gasket and stainless steel faceplate. Receptacle to be three (3) prong grounded type installed to meet all safety and electrical codes.

SHELF UNDER: Under top, where shown on plan furnish 16 gauge stainless steel removable shelf with all free edges rolled over 90 degrees to match contour of crossrails. Edge against drawer enclosure to be turned up 2" with coved interior corners. Shelf to be made in two (2) removable sections with edges turned down 1" at 90 degree bend at all joints. Shelf to be open type accessible from both sides of work table.

SHELF OVER: Over top as shown on plan furnish single deck 14" wide 16 ga. st. st. shelf with 1" rolled rim on all sides. Shelf to be mounted on 1 1/4" dia., st. st. cantilever uprights extending up thru top Holes in top to be cut out to fit upright with not more than 1/16" clearance, then caulked with clear silicone sealant. Over top of shelf provide attachment rack. Rack construction to be similar to Advance Tabco SWT-120. Attachment rack to be provided with 36 hooks.

LEGS: Cabinet base to be mounted on Standard-Keil #1072-0621-1755, 6" high st. st. adjustable legs with flange feet.

Submit shop drawing for review and approval.

ITEM # 14 ST. ST. WALL PANELING

One (1) Lot of 18 ga. Stainless steel rear wall paneling sized per plan and elevation detail. Provide wall panels from bottom edge of hood down to top of base cove. Verify height of cover before fabrication. Provide panels with finish to match hood and in lengths to match hood(s) section(s) wherever possible. Panels to butt together with hairline joint and be installed with concealed fasteners. FSEC to provide cut outs in panel to accommodate utilities

ITEM # 15 HAND SINK, WALL MOUNT

QTY: Three (3)

MFG. & MODEL: ADVANCE #7-PS-40

CONST: Sink to be constructed of Stainless Steel Sink to be furnished with 8" backsplash with 2" return to wall and flange down.

ACCESSORIES: Furnish with strainer type 6" tailpiece and "P" trap all to be chrome plated brass. Faucet shall be T & S EC 1301 TMV or equal ADVANCE electronic gooseneck faucet, aerator, mixing valve, 120 Volt A.C. transformer. Soap and towel dispenser to be provided by owner. Unit to include right and left hand splash shields.

DETAILS: Sink to be mounted with rim 34" above finished floor with rough-in for water and waste located 4-7/8" below the 6-1/2" deep sink.

ITEM # 16 ST. ST. FLOOR DRAINER

QTY: One (1)

MFG & MODEL: ADVANCE TABCO MODEL # FFTG-1830

CONST: Floor Trough, 18"W x 30"D x 4" deep, with fiberglass grating, stainless steel removable strainer basket, 4" O.D. waste pipe 3"L, pitched towards waste

FSEC to turn unit over to plumbing trades for installation. FSEC to assist in locating unit to insure proper pour path.

ITEM # 17 TILT SKILLET, GAS

QTY: One (1)

MFG: GROEN MODEL: BPM-40G

SPECIFICATIONS: Unit shall be a forty gallon, gas fired, tilting skillet. Unit to be stainless steel interior and exterior. Stainless steel clad 5/8" cooking surface, with specially designed welded heat transfer fins. Also provide unit with a torsion bar type counterbalanced cover, adjustable thermostat, and electronic intermittent pilot ignition system. Unit is standard with manual hand tilt and shall tilt past vertical for cleaning.

ACCESSORIES:

One (1) Lot flange feet. Secure to floor with st. st. lag bolts.
One (1) Pan Carrier
One (1) Double Pantry Faucet
One (1) Lot of gas and water hoses with quick disconnects included with item #14.

UTILITY REQMTS:

Natural Gas 115 v, 60 Hz, single phase for controls -Hot and Cold water connections (faucet)

ITEM # 18 STEAMER, BOILERLESS, GAS

QTY: One (1)

MFG & MODEL: GROEN MODEL# (2)SSB-5GF

CONST: SmartSteam™ 100 Convection Steamer, gas, double-stacked, boilerless generator, open leg stand bullet feet, (5) 12 x 20 x 2-1/2" pans capacity per compartment, door, stainless steel interior & exterior, 62,000 BTU each

ACCESSORIES:

One (1) SmartSteam water treatment kit
One (1) Drain tempering valve
One (1) Set of casters
One (1) DORMONT Gas and water quick disconnect kit
One (1) DORMONT Safety Set caster positioner kit

ITEM # 19 ST.ST. EXHAUST HOOD

One (1) CAPTIVEAIRE model # 6630-ND-2 -ACPSP-F exhaust only canopy with supply plenum rated for all types of cooking equipment. The hood shall have the size, shape and performance specified on drawings. Construction shall be type 304 stainless steel with a #4 polish where exposed. Individual component construction shall be determined by the manufacturer, ETL, and NSF. Construction shall be dependent on the structural application to minimize distortion and other defects. All seams, joints and penetrations of the hood enclosure to the lower outermost perimeter that directs and captures grease-

laden vapor and exhaust gases shall have a liquid-tight continuous external weld in accordance with NFPA 96. Hood shall be wall type with a minimum of four connections for hanger rods. Connectors shall have 9/16" holes pre-punched in 1 ½" x 1 ½" angle iron at the factory to allow for hanger rod connection by FSEC.

Ventilator shall be furnished with U.L. classified high efficiency stainless steel baffle filters, supplied in size and quantity as required by ventilator. The filters shall extend the full length of the hood and the filler panels shall not be more than 6" in width.

The hood manufacturer shall supply complete computer generated submittal drawings including hood sections view and hood plan view. These drawings must be available to the engineer, architect and owner for their use in construction, operation and maintenance.

Exhaust duct collar to be 4" high with 1" flange. Duct sizes, CFM and static pressure requirements shall be as shown on drawings. Static pressure requirements shall be precise and accurate; air velocity and volume information shall be accurate within 1-ft increments along the length of the ventilator.

The hood shall have:

A double wall insulated front to eliminate condensation and increase rigidity. The insulation shall have a flexural modulus of 475 EL, meet UL 181 requirements and be in accordance with NFPA 90A and 90B.

An integral front baffle to direct grease laden vapors toward the exhaust filter bank.

Removable grease cup for easy cleaning.

The hood shall be ETL Listed as "Exhaust Hood Without Exhaust Damper", NSF Listed and built in accordance with NFPA 96. The hood shall be listed for 450°F cooking surfaces at 150 CFM/ft, 600°F cooking surfaces at 200 CFM/ft, and 700°F cooking surfaces at 250 CFM/ft. The hood shall be ETL Listed as "Exhaust Hood Without Exhaust Damper".

Accessories to be included:

One (1) Flush Mounted ACPSP with LED Lights

One (1) Lot Recessed Round LED lights

Two (2) St. St. full end panels w/ legs

One (1) Lot Stainless filters Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 93% efficient at 9 microns, 72% efficient at 5 microns

One (1) Lot Field Wrapper Panels

One (1) Lot Balance Damper

One (1) Lot of Temperature Sensors, hood controls, fans, make up air, duct work etc. to be furnished and installed by Mechanical Trades. See Mechanical Plans and Specifications for CA demand control variable speed drives, etc. "NIC"

Submit shop drawing for review.

ITEM # 19.1 EXHAUST HOOD FAN/LIGHT CONTROL

One (1) Lot SC-011110FP Wall Mounted Starter Coil Control Only w/ 1 Exhaust Fan, 1 Supply Fan, Exhaust on in Fire, Lights out in Fire, Fan(s) On/Off Thermostatically Controlled. Room temperature sensor shipped loose for field installation. Includes 1 Duct Thermostat kit. – 14 x 18 Stainless Steel Box. Includes latch and back plate - Digital Pre wire Lighting Relay Kit. Includes hood lighting relay & terminal blocks. Allows for up to 1400 Watt of lighting each. - Thermistor CABLE - 18/2 AWG GREEN WHITE, plenum rated. USED for thermistor duct stat. FSEC to turn box over and coordinate with mechanical and electrical trades for installation and wiring.

ITEM # 20 FIRE SUPPRESSION SYSTEM

One (1) system completely installed ANSUL R102 Wet Chemical Restaurant Kitchen Fire Suppression System sized to meet job requirements in accordance with the manufacturer's specifications and installed only by an authorized Ansul Pre-Engineered Restaurant Fire System Distributor. This system must be installed in accordance with UL-300, BOCA, NFPA-17A, NFPA-96 and the authority having jurisdiction. The ANSUL R102 installing company must carry complete Operations Liability Insurance of a minimum of \$1,000,000.

NOTE! Units MUST BE INSTALLED IN the ANSUL R102 factory stainless steel ENCLOSURES. Any Fire System not completely installed in an authorized cabinet must be approved by the Food Service Equipment Consultant in writing prior to such substitution. Cabinet installation must comply with CABO/ANSI A117.1-1992.

NOTE! Mechanical Gas Valves must be used for automatic shut-off. Any Fire System installed using an Electric Gas Valve must have written approval from the Food Service Equipment Consultant prior to such installation.

System to provide automatic fire suppression for the plenum area of Exhaust Hood, connecting exhaust ducts.

STANDARD: All equipment and the complete system shall conform to NFPA #96, vapor removal from cooking equipment Underwriters Laboratories File #EX2458.

APPROVALS: All devices furnished shall be constructed and installed in accordance with this specification and shall be U.L. approved.

MATERIAL: Exhaust Hood, Duct, and Cooking Appliance Fire Suppression shall be ANSUL R102.

INSTALLATION: System shall be installed in conformance with the latest edition of applicable standard of NFPA 17A, NFPA 96, BOCA, Manufacturer's manual and all applicable state and local codes.

1. Installer shall visit the job site, take all field measurements and verify all conditions affecting the work unless shown on attached plan.
2. Obtain and pay for any permits specifically required for the fire suppression installation.
3. Provide shop drawings showing the piping and mechanical detail of the fire system to the authority having jurisdiction.

TEST: Upon completion of installation, seller to perform all tests necessary to fulfill requirement of the authority having jurisdiction.

SPECIFIC JOB SITE REQUIREMENTS: System to be provided with Four (4) Micro switches (DPDT) mounted in the ANSUL R102 control cabinet. Second switch to be interfaced with the building Fire Alarm, if required.

System installer to provide a manual reset relay to the Electrical Contractor for installation into the fuel shut-off system.

The installer to provide the Plumbing Contractor one mechanically operated automatic gas shut-off valve, for each fire suppression system, sized for the job requirements. Plumber is to install the valve. System installer is to connect the gas valve cable to the ANSUL R102 control cabinet.

The ANSUL R102 System must be located where shown on the food service equipment drawings.

NOTE! ANY RELOCATION of the ANSUL R102 System MUST BE APPROVED by the Food Service Equipment Consultant in writing prior to such relocation.

The ANSUL R102 Fire System installer shall be responsible for cutting or punching holes in walls, ceilings and floors for installation of the equipment. The installer will be responsible for furnishing trim flanges or patching and painting of any holes required for the installation of the ANSUL R102 System.

PIPING: Fire System to be per ANSUL R102 standards. All piping and conduit of the ANSUL R102 is to be concealed where possible and all piping and conduit to be either chrome plated, chrome sleeved or stainless steel where exposure is necessary.

PLUMBING CONTRACTORS RESPONSIBILITIES: The Plumbing Contractor shall be responsible for the installation of the automatic gas shut-off valve required for the automatic shut-off of the gas supply to all gas operated appliances under Exhaust Hood.

The valve shall be installed as near as possible to the subject cooking equipment and should not be installed in a location that would affect the shutdown of the gas supply to any gas operated equipment not located under the Exhaust Hood. The mechanical gas shut-off valve required under this specification shall be furnished to the Plumbing Contractor by the ANSUL R102 System installing company.

ELECTRICAL CONTRACTOR'S RESPONSIBILITIES: The Electrical Contractor shall be responsible for all labor and materials required to completely connect the cooking fuel shut-off system.

The Electrical Contractor shall be responsible for installing a ½" conduit and flush-mounted standard 4" X 4" electrical octagon box with screws at 2 & 8 o'clock for each ANSUL R102 system. Verify height requirement with Authority Having Jurisdiction.

This is to be used for the manual pull station to activate the Fire System. The ½" conduit should extend approximately 15" above the finished ceiling.

The following must be completed by the Electrical Contractor (See electrical rough-in plan for details):

1. All electrical under the Exhaust Hood must shut down upon activation of the ANSUL R102 Fire System. This includes all outlets, hard-piped appliances and all refrigeration stands.
2. All Make-up Air Units for the Exhaust Hoods in the kitchen must shut down.
3. Exhaust Hood Fans must continue to run.
4. If an electrical gas valve is used, a manual reset relay must be used. This relay is to be supplied by the ANSUL R102 installer.
5. If Fire Alarm notification is required, one of the micro switches is to be used for this purpose.
6. No electrical connections to be made inside the ANSUL R102 control cabinet.

ITEM # 21 DOUBLE DECK CONVECTION OVEN

QTY: One (1)

MFG & MODEL: SOUTHBEND MODEL # GS/25SC

CONST: Marathoner Gold Convection Oven, gas, double-deck, standard depth, solid state controls, energy savings system "NRG", stainless steel front, sides, top, and rear jacket, 180,000 BTU

ACCESSORIES:

One (1) Set of casters, two with locks
One (1) Dormont gas quick disconnect kits with restraint
One (1) DORMONT Safety Set caster positioner kit

ITEM # 22 PORTABLE WARMING CABINET

Three (3) FWE model #MTU-12 portable hot food cart. Units to be sized to accommodate both 12 x 20 & 18 x 26 pans and trays. Provide units with the following standard and optional accessories:

One (1) Lot of locking casters
One (1) UL Approved cord and plug

ITEM # 23 MICROWAVE OVEN

One (1) PANASONIC MODEL # NE-1054F Pro Commercial Microwave Oven, 1000 watts, 0.8 cu. ft. capacity, (6) power levels, 2 & 3 stage cooking, touch control pad with Braille, 99 minute timer, programmable and manual operation, (10) programmable memory pads with (20) memory capability, program list/cycle counter, self-diagnostics, tone control, bottom energy feed, interior light, see through door with "grab & go" handle, stainless steel front, 120v/60/1 ph, 13.4 amps, NEMA 5 15P, cULus, NSF

ITEM # 24 ST. ST. MICROWAVE SHELF

One (1) ADVANCE TABCO model # MS-18-24 st. st. wall mounted microwave shelf furnished per manufacturers standards. FSEC to secure shelf to wall with heavy duty anchors and st. st. screws.

ITEM # 25 ST. ST. PREP SINK AND TABLE

One (1) Custom fabricated unit sized per plan x 34" high to working surface.

TOP: Fabricated of 14 ga. Stainless Steel with front and exposed end furnished with type "A" edges

BACKSPLASH: Rear and sides as shown on plan, against walls or equipment to be furnished with 8" high integral backsplash. Top to be turned back at 45 degree angle with 1" return down parallel to wall. Furnish 14 gauge stainless steel "Z" clips to hold backsplash tight to wall in neat and workmanlike manner. Provide clear silicone sealant to wall and equipment per Board of Health requirements. See Edge Detail type "G" for construction requirements.

SINKS: In top, furnish two compartment Integrally welded sinks 21" x 26" x 12" deep. Bottom of sink compartments to be pitched and furnished with die stamped opening to accommodate waste flange. Sink to be all coved cornered and fabricated per General Requirements.

SINK TRIM: Sink to be furnished with the following:

One (1) T&S B-0230-LN with One (1) 060X 8" swing nozzle
One (1) T&S B-0199-01 Aerator
One (1) T&S B-0230-K Nipple Assembly
One (1) T&S B-3950-01 Lever waste with over flow assembly. twist drain handle furnished with 14 gauge stainless steel brackets welded to underside of sink.

Sink trim to be furnished with identification tags and signed over to the Plumbing Trades for their internal and final connections to rough in locations.

LEG SUPPORTS: Top and sink to be mounted on EFW all stainless steel one (1) leg support. Gusset, leg, crossbrace and wall flange fabricated in accordance with isometric detail drawing attached to contract drawings.

SHELF UNDER: Under top, per plan or elevation, furnish 16 gauge stainless steel removable shelves. Shelves to be rolled over crossrails in front and sides. Rear to be turned up 3" against walls or side equipment. Shelves to be all coved cornered fabricated at not less than 5/8" radius.

DRAWER: Under top as shown on plan furnish 18 gauge stainless steel drawers 20" x 20" x 5" deep. Drawer insert to be removable type with roller bearing extension slides, double pan construction drawer front and 18 gauge stainless steel cabinet enclosure constructed per General Requirements. Drawer to be furnished with cylinder lock installed per manufacturer's recommendations. All drawer locks to be keyed alike on entire job.

SHOP DRAWING: Submit shop drawing for review and approval.

ITEM # 26 ST. ST. CLEAN DISHTABLE

One (1) Lot included with item # 34.

ITEM # 27 ST.ST. WALL PANELING

One (1) Lot of Custom Fabricated 18 ga. st. st. rear and side wall paneling 30" high by length and width as shown on plan. Furnish paneling hair line butt joints. Paneling to be sealed on sides and top with clear silicone sealant.

Submit shop drawing for review and approval

ITEM # 28 WIRE WALL SHELF

One (1) Lot Metro SuperBright wire wall shelving sized per plan. Unit to consist of two (2) 14" deep chrome shelves with two (2) 2WD14C chrome wire wall supports. Each chrome wire wall support consists of one shelf support and mount plate with two caps. FSEC to mount wire shelf supports to wall with heavy duty wall anchors and st. st. screws.

ITEM # 29 ST.ST. CONDENSATE HOOD

One (1) CAPTIVEAIRE model #4830 VHB-G 30" high x size shown on plan for dishwasher. Hood to have a dimension of 6'- 8" from bottom edge of gutter down to floor line.

Unit to be fabricated of 18 ga. st. st. all welded construction of box type design. Bottom edge to be furnished with 1-1/2" wide 18 ga. st. st. gutter. Inside edge of gutter to be slanted at 60° angle. All welds to be ground and polished smooth to match original finish.

Interior to be furnished with NSF approved LED fixture. Mount on interior top of hood and furnish wiring to "J" box ready for final connection by electrical contractor. All wiring to be installed in conduit in accordance with local and state electrical codes.

Top of hood to be furnished with 12 ga. st. st. channel supports to accommodate 1/2" dia., st. st. hanger rods, fastened to angle supports above suspended ceiling. Angle supports or inserts in slab above to be furnished and installed by FSEC. Condensate gutter to be furnished with 1/2" dia., grey CPVC drain tube from gutter to extend down to top of backsplash on soiled dishtable. Tube to be secured with st. st. wall bracket.

At top of hood at ceiling, furnish 18 ga. st. st. trim angles with feathered edges and welded mitered corners. Size of trim angles to be designed to suit field conditions. Inside of hood to be furnished with cutout to accommodate exhaust duct furnished by HVAC contractor. Furnish opening with 2" x 2" x 18 ga. st. st. trim collar with feathered edges and welded mitered corners.

Submit shop drawing for review.

ITEM # 30 SPARE - NOT USED

ITEM # 31 ST.ST. WALL PANELING

One (1) Lot of Custom Fabricated 18 ga. st. st. rear and side wall paneling 30" high by length and width as shown on plan. Furnish paneling hair line butt joints. Paneling to be sealed on sides and top with clear silicone sealant.

Panel section behind dishwasher to run from bottom edge of condensate hood down to top of coved tile base. FSEC to provide necessary cut outs for power and water supply lines.

Submit shop drawing for review and approval.

ITEM # 32 WAREWASHER, DOOR TYPE, HIGH TEMP

QTY: One (1)

MFG/MODEL: HOBART Model #AM-15T

CONST: Unit to have spring counter balanced doors arranged for straight thru installation as shown on plan. Drawn Tank, Tank shelf and feet constructed of 16 ga. st. st. Frame to be constructed of 12 gauge st. st. Chamber to be constructed of 18 ga. st. st. Removable trim panels to be constructed of 20 ga. st. st.

ACCESSORIES:

- One (1) Single Point electrical connection
- One (1) Pressure reducing valve sized for dishwasher capacity (unconnected)
- One (1) Automatic tank fill
- One (1) Built in Sens-a-temp 70 degree rise electric booster heater
- One (1) 5 KW Tank heater

One (1) Lot of low water tank heat protection
One (1) Splash proof pump motor
One (1) Lot of interlocked door safety switches
One (1) Lot of interchangeable spray arms
One (1) Lot of st. st. front and side panels
One (1) Lot of detergent connection provisions
One (1) Lot of NSF approved gauges on rinse & wash water
One (1) NSF Pot and Pan listed 2, 4 and 6 minute Cycle
One (1) Timed wash cycles for 1,2,4 or 6 minutes
One (1) 27" door opening for 18" x 26 sheet pans or 60 qt. mixing bowl
One (1) Stainless Steel Pump and Impeller
One (1) Vent Fan Control
One (1) Splash Shield for corner installation
One (1) Delime notification (field activated) and Delime Cycle
One (1) Drain Water tempering kit
One (1) Sheet Pan Rack
Three (3) Standard 20" x 20" dish racks
Three (3) Standard 20" x 20" open racks (silverware)

DETAILS: Dishwasher size to be 77.5" Tall x 27" Wide x 28.5" Deep with 5 .686 " clearance to rear wall.

ITEM # 32.1 SOAP AND RINSE SYSTEM

One (1) Soap and rinse system provided by owners soap vendor. "NIC"

ITEM # 33 DISPOSER, GARBAGE

QTY: One (1)

MFG/MODEL: IN-SINK-ERATOR SS-300-18B-AS101

CONSTRUCTION: Unit shall be a commercial, heavy-duty disposer with three (3) horsepower motor, stainless steel and chrome plated finish. Control Panel shall be 18 gauge st. st. NEMA 4, waterproof enclosure.

ACCESSORIES:

One (1) 18" cone w/ two fixed nozzles
One (1) St. St. Removable Cover and Scrap Block
One (1) Automatic Reversing Feature
One (1) Time Delay Relay set for 30 seconds
One (1) 24 volt line voltage transformer, controls operate on 24 volts
One (1) Line Disconnect Switch, Interlocks with front cover
One (1) Start/Stop Push Button
Two (2) Flow control valves, and solenoids
One (1) St. st. support leg
One (1) 14 gauge st. st. mounting bracket
One (1) T&S B-2278 Pre-rinse unit w/ built in vacuum breaker & wall support
One (1) T&S B-0455 Vacuum Breaker Assembly w/ chrome plated pipe extension & elbows above backsplash area

DETAILS: Cone to be continuously welded to top with all welds ground and polished smooth. Control panel bracket welded to underside to top and set back so disconnect handle does not project beyond edge of table. Backsplash to be pre-drilled on exact centers to accommodate Vacuum Breaker Assembly. FSEC shall tag all accessories with item numbers and locations of equipment. Accessories are then to be

delivered to Plumbing and Electrical Contractors for their internal and final connections. FSEC shall furnish detailed drawings showing proper installation of loose accessories and piping details.

ELECT: Per Rough in plan

ITEM # 34 SOILED TABLE/THREE COMPARTMENT SINK

One (1) Custom Fabricated unit in size 30" deep x length as shown plan with integral pitch to allow tables to drain towards dishwasher or table drainers.

TOP - Fabricated of 14 gauge stainless steel with front and exposed ends furnished with type "D" raised rim with apron type edge. Working surface to have integral pitch to drain surface area of any excess water. Top of rim to be parallel with floor. Reinforcing under and polish to be furnished in accordance with General Requirements and standard edge details.

BACKSPLASH - Rear and sides were shown on plan, against walls or equipment to be furnished with 12" high integral backsplash. Top to be turned back at 45 degree angle with 1" return down parallel to wall. Furnish 14 gauge stainless steel "Z" clips to hold backsplash tight to wall in neat and workmanlike manner. Provide clear silicone sealant to wall and equipment per Board of Health Requirements. See Edge Detail type "G" for construction requirements. FSEC to coordinate backsplash with roll down closure track.

LEG SUPPORTS AGAINST WALL - Top and sink to be mounted on EFW all stainless steel one (1) leg support. Gusset, leg crossbrace and wall flange fabricated in accordance with isometric detail drawing attached to contract drawings.

SHELF UNDER - Under top as shown on plan or elevation, furnish 16 gauge stainless steel removable shelf. Shelf to be rolled over crossrails in front and sides. Rear to be turned up 3" against walls or side equipment. Shelf to have all coved corners at not less than 5/8" radius. Omit crossrail and undershelf under clean dishtable for dish cart storage.

DISPOSER CUTOUTS - Where shown, top to be cut out to accommodate disposer cone specified under separate item. Cone to be continuously welded around full perimeter, then ground and polished smooth to a #4 satin finish. Under top furnish 14 ga. st. bracket to accommodate disposer control panel or switch. Rear backsplash to be punched out to accommodate vacuum breaker assembly specified under disposers item #33.

SOILED TRAY/DISH DROP: As shown on plan provide drop off window area with dish table extending trough pass opening. Table to be provided with full width inverted "V" at pass opening to prevent liquids from dripping down wall. Drop off edge to be furnished with 2" turn down with enclosed ends. Exposed blocking will not be accepted.

TABLE DRAINER - In top of soiled table, furnish integrally welded table drainer 6" wide x 3" deep x full width of dishtable. (Full width to mean from front vertical inside edge of rolled rim to back of vertical edge of backsplash). Inside edges both horizontally and vertically furnished with not less than 1/2" radius. Interior of drainer to be furnished with all coved cornered perforated strainer basket made of 16 gauge stainless steel.

Include 1/4" stainless steel rod guide handles to allow racks to slide over drainer area. Drainer pitched to drain and to have die stamped opening and furnished with basket drain, brass chrome plated with 1-1/2" tailpiece.

SINKS: In top, furnish three (3) integrally welded sink compartments per plan location. Sink compartments to be 21 x 26" x 14" deep. Bottom of each sink compartment furnished with die-stamped opening to accommodate waste flange. Sink bottom all coved cornered, pitched to waste and fabricated per General Requirements.

SINK TRIM: Three (3) compartment unit to be furnished with the following:

Two (2) T&S Model B-0290-112X (3/4" I.P.S) to fit in rear of Backsplash to accommodate 3/4" water lines
Left hand Pre-rinse w/ 10" "Add a Faucet" (1) T&S Model B-0287-427-B, Remove T&S Model 114X, 12"
spout and provide T&S Model 112x 10" spout.

Furnish each faucet complete with T&S Model B-0427 Assembly to facilitate fastening to Backsplash

Three (3) T&S Model B-3950-01 Twist Handle Drains with connected rear overflow & 010387-45
removable basket strainers. Twist Handle Drains Furnished with 14 ga. st. st. bracket welded to underside
of sink.

Sink trim to be furnished with identification tags and signed over to Plumbing Trades for their internal and
final connections to rough-in locations.

Submit shop drawing for review and approval.

ITEM # 35 MOBILE CASHIER UNIT

One (1) ATLAS Model # BLM L Cashier Stand furnished per manufacturers standards. See plan for tray
slide location.

Include the following Accessories:

- One (1) 34" High working height
- One (1) Punch out in top with grommet sized to accommodate cord and plug.
- One (1) Lot laminate panels (verify color at later date)
- One (1) Solid bottom shelf
- One (1) St. St. drawer
- One (1) 12" wide st. st. tray slide mounted 33" above floor
- One (1) Convenience Outlet under top for cash register
- One (1) Locking device to connect counters
- One (1) Lot casters, two (2) with locks
- One (1) Skirt to match units on legs

Submit shop drawing for review and approval. See rough in plan for cord and plug requirements

ITEM # 36 POS/REGISTER

One (1) POS system furnished and installed by owner. "NIC"

ITEM # 37 COLD FOOD COUNTER

One (1) ATLAS BLC-4 RM 63.5" long self-serve three pan cold food counter. The cold pan shall be
constructed of 18 gauge type 304 stainless steel with a solid vinyl gasket. The top of the unit shall be
constructed of 16 gauge type 304 stainless steel. Unit shall be provided with a fully self-contained
condensing unit. The frame shall be constructed of hi-tensile square aluminum tubing. Unit shall be
provided with enclosed base and 5" diameter casters.

ACCESSORIES:

- One (1) 34" High working height
- One (1) PRCL-4 Protector case with light and two (2) Plexiglas end panels

One (1) SH-4 8" wide stainless steel work shelf
One (1) Lot casters, two (2) with locks
One (1) 12" St. St. Tray Slide mounted 33" above floor
One (1) Lot Cam locking devices
One (1) Laminate Panels (color to be determined by architect)
One (1) Bottom shelf
One (1) Drain with shut off valve
One (1) UL Cord and plug for lights & compressor.
One (1) Year refrigeration Service
Five (5) Year compressor warranty
One (1) Skirt to match height of units on legs

Submit shop drawing for review and approval.

ITEM # 38 PROTECTOR CASE

One (1) Full Service protector case included with item #37.

ITEM # 39 FLAT TOP COUNTER

QTY: One (1)

MFR./MODEL: ATLAS BLU-2

SPECIFICATIONS: Provide one mobile serving unit with flat top. The top of the unit shall be constructed of 16 gauge type 304 stainless steel. The frame shall be constructed of hi-tensile square aluminum tubing.

ACCESSORIES:

One (1) 34" High working height
One (1) 12" St. St. Tray Slide mounted 33" above floor
One (1) Laminate Panel (color to be determined by architect)
One (1) Lot st. st. legs with adjustable feet
One (1) Locking device to connect counters
One (1) Installation of BSI hand sink drawer per manufacturers standards.

Submit shop drawing for approval

ITEM #40 HAND SINK DRAWER

One (1) BSI, INC., model #HSD-ST st. st. hand sink drawer assemblies. Unit to be furnished complete with faucet, drainer, soap and tower dispenser.

NOTE! Paper towel compartment must be sized to accommodate standard 10" x "C" fold towel.

Unit to be shipped to ATLAS for in shop installation. Plumbing trades to be responsible for final HW/CW supply and waste connections.

ITEM # 41 HOT FOOD COUNTER

QTY: One (1)

MFG: ATLAS BLH-4-OT

SPECIFICATIONS: Provide one mobile serving unit with four (4) 12" x 20" x 6" hot food wells. Each well shall be provided with an 850 watt heating element. The top of the unit shall be constructed of 16 gauge type 304 stainless steel. The frame shall be constructed of hi-tensile square aluminum tubing.

ACCESSORIES:

- One (1) T & S Cold Water Panty Faucet
- One (1) TS-4, 12" Folding Tray Slide.
- One (1) PRHC-4 Protector Case with fixed glass panel and Heat & light, and two (2) Plexiglas end panels
- One (1) Lot of Plastic Laminate Panels (color to be determined)
- One (1) USB-4 Bottom Shelf
- One (1) EFW Rotated pan for easy reach to drains.
- One (1) Lot of Drains and valves with individual valves, manifolded to operator's side
- One (1) SH-4 8" wide stainless steel work shelf
- One (1) lot of Apron Mounted Controls AMC-4
- One (1) Lot 6" st. st. legs with bullet feet
- One (1) UL Cord and plug
- One (1) Locking device to connect counters

Submit shop drawing for review

ITEM # 42 PROTECTOR CASE

One (1) Full Service protector case included with item #41.

ITEM # 43 MILK COOLER

One (1) BEVERAGE AIR model SMF49-S 12 case forced air milk cooler. Unit to be provided per manufacturers standards. Include the following standard and optional accessories:

- One (1) Lot locking casters
- One (1) Lid lock
- One (1) UL cord and plug
- One (1) Thermometer
- One (1) Year Refrigeration Service Policy
- Five (5) Year Compressor warranty

ITEM # 44 DISPLAY CASE, REFRIGERATED

One (2) TRUE model #GDM-23-LD reach in glass door display cooler furnished per manufacturers standards. Include the following:

- One (1) Glass door hinged per plan
- One (1) Stainless Exterior – Verify color with Architect
- One (1) Stainless Interior - – Verify color with Architect
- One (1) Set of 4" casters, two with locks
- One (1) Door lock
- One (1) UL Cord and plug

ITEM # 45 ST. ST. WORK TABLE

Two (2) ADVANCE TABCO model #SS-308 st. st. work tables furnished per manufactures standards. Include the following with each.

Two (2) Heavy duty enclosed 20x20 drawers
One (1) Full length st. st. shelf under
One (1) Lot st. st. legs with heavy duty casters with locks
One (1) OTS-12-96 table mounted overshef mounted to rear per plan

ITEM # 46 LOCKERS

One (1) Lot of employee lockers specified by architect. "NIC"

ITEM # 47 MILK COOLER

One (1) BEVERAGE AIR model SMF49-S 12 case forced air milk cooler. Unit to be provided per manufacturers standards. Include the following standard and optional accessories:

One (1) Lot locking casters
One (1) Lid lock
One (1) UL cord and plug
One (1) Thermometer
One (1) Year Refrigeration Service Policy
Five (5) Year Compressor warranty

ITEM # 48 SPARE - NOT USED

ITEM # 49 FIELD ERECTION LABOR

FSEC shall deliver, unload, uncrate, and install all items herein specified ready for final plumbing, electrical and ventilation connections furnished by respective trades as outlined in the General Requirements.

All equipment shall be cleaned and polished before demonstrating equipment to the Owner. All crating and packing material to be removed from job site.

FSEC shall arrange demonstration date with Owner and at the same time check out all loose items with the Food Service Manager.

FSEC shall be responsible for missing items unless he can produce signed receipts from Owner's personnel that the items were received and accounted for. Owner cannot be responsible for items delivered to the job site that were dropped off without being signed for by Owner's personnel or representatives.

Rough-in plans to be submitted at a scale of 1/4" = 1'-0". When present equipment is re-used at new locations, it shall be the FSEC'S responsibility to show necessary rough-in requirements for these items. (See General Requirements for complete details relating to submission of shop drawings).

Two (2) complete sets of all final shop drawings, instructions, and parts lists are to be turned over to the Owner secured in a binder. This booklet shall include the telephone number and address of the service company for each piece of equipment.

NOTE! FSEC shall pay all sales, consumer, use and other similar taxes for the work or portions thereof provided by the Contractor which are legally enacted at the time bids are received, whether or not yet effective.

Final payment cannot be recommended until all of the above items have been completed to our satisfaction.

ITEMIZED PROPOSAL FORM
NEW HIGH POINT SCHOOL
ANN ARBOR, MI

NAME OF BIDDER: _____

ADDRESS: _____

DATE: _____ TELEPHONE NO _____

BASE BID

If this Proposal is accepted in writing within thirty (30) days from the date of the bid opening, undersigned having familiarized themselves with the drawings and specifications as prepared by E. F. WHITNEY, INC., agrees to enter into a Contract for furnishing all labor, materials, and facilities for Food Service Equipment in connection with the above named project for the total base bid sum amount of \$ _____ including sales tax.

(\$ _____ DOLLARS)

The amount shown shall be shown both words and figures. In case of a discrepancy, the amount shown in words shall govern. Sales tax amount must be shown.

TIME OF COMPLETION

The Bidder agrees to complete the above named project in _____ consecutive calendar days.

BID GUARANTEE TYPE: _____

AMOUNT \$ _____

CONTRACT ASSUMPTIONS

The Bidder agrees to enter into a sub contract with the General Construction Work Contractor, (Architectural Trades) as designated by the Owner. The sub contract shall be based upon the prices, terms, and conditions set forth in the Proposal.

ADDENDA

Proposal is based on the following Addenda:

Addendum # _____ Dated: _____

Addendum # _____ Dated: _____

Addendum # _____ Dated: _____

SIGNATURE

Signed By: _____

Dated and signed at: _____

State of _____ this _____ day of _____, 2018

LEGAL STATUS OF BIDDER

A Corporation duly organized and doing business under the laws of the State of _____ for whom _____ whose signature is affixed to this Proposal is duly authorized to execute contracts.

A Partnership, all members:

An individual whose signature is affixed to this Proposal: _____

INSTRUCTIONS

The Base Bid must be on fixtures specified for a fair comparison of all the bids. Prices on alternate equipment will be accepted on a separate sheet made up by the Bidder with illustrations and alternate specifications.

The following pages contain a schedule of the various items of equipment. All manufacturers names and other data requested must be filled in by the Bidder.

ON FABRICATED ITEMS, PLEASE GIVE THE NAME OF YOUR FABRICATOR

| ITEM NUMBER | DESCRIPTION | QUANTITY | MANUFACTURER'S OR FABRICATOR'S NAME AND MODEL NUMBER | PRICE |
|-------------|-----------------------------------|----------|--|-------|
| 1 | Walk In Refrigerator/Freezer | _____ | _____ | _____ |
| 2 | Refrigerator Condensing Unit | _____ | _____ | _____ |
| 2.1 | Refrigerator Blower Coil | _____ | _____ | _____ |
| 3 | Freezer Condensing Unit | _____ | _____ | _____ |
| 3.1 | Freezer Blower Coil | _____ | _____ | _____ |
| 3.2 | Heat Tape | _____ | _____ | _____ |
| 4 | Store Room Shelving | _____ | _____ | _____ |
| 5 | Rack, Pan | _____ | _____ | _____ |
| 6 | Portable Storage Shelving | _____ | _____ | _____ |
| 7 | Cart, Utility | _____ | _____ | _____ |
| 8 | Rack, Dunnage | _____ | _____ | _____ |
| 9 | Portable St. St. Table | _____ | _____ | _____ |
| 10 | Rack, Dunnage | _____ | _____ | _____ |
| 11 | Portable Walk In Ref/Fzr Shelving | _____ | _____ | _____ |
| 12 | Existing Food Processor | _____ | _____ | _____ |
| 13 | St. St. Work Table W/ Sink | _____ | _____ | _____ |
| 14 | St. St. Wall Paneling | _____ | _____ | _____ |
| 15 | Hand Sink, Wall Mount | _____ | _____ | _____ |
| 16 | St. St. Floor Drainer | _____ | _____ | _____ |
| 17 | Tilt Skillet, Gas | _____ | _____ | _____ |
| 18 | Steamer, Boilerless, Gas | _____ | _____ | _____ |
| 19 | St. St. Exhaust Hood | _____ | _____ | _____ |
| 19.1 | Exhaust Hood Fan/Light Control | _____ | _____ | _____ |
| 20 | Fire Suppression System | _____ | _____ | _____ |
| 21 | Double Deck Convection Oven | _____ | _____ | _____ |
| 22 | Portable Warming Cabinet | _____ | _____ | _____ |
| 23 | Microwave Oven | _____ | _____ | _____ |

| | | | |
|---------------------------------|-------|-------|-------|
| 24 St. St. Microwave Shelf | _____ | _____ | _____ |
| 25 St. St. Prep Sink And Table | _____ | _____ | _____ |
| 26 St. St. Clean Dishtable | _____ | _____ | _____ |
| 27 St. St. Wall Paneling | _____ | _____ | _____ |
| 28 Wire Wall Shelf | _____ | _____ | _____ |
| 29 St. St. Condensate Hood | _____ | _____ | _____ |
| 30 Spare - Not Used | | | |
| 31 St. St. Wall Paneling | _____ | _____ | _____ |
| 32 Warewasher, Door Type, | _____ | _____ | _____ |
| 32.1 Soap And Rinse System | _____ | _____ | _____ |
| 33 Disposer, Garbage | _____ | _____ | _____ |
| 34 Soiled Table/Three Comp Sink | _____ | _____ | _____ |
| 35 Mobile Cashier Unit | _____ | _____ | _____ |
| 36 Pos/Register | _____ | _____ | _____ |
| 37 Cold Unit | _____ | _____ | _____ |
| 38 Protector Case | _____ | _____ | _____ |
| 39 Flat Top Utility Counter | _____ | _____ | _____ |
| 40 Hand Sink Drawer | _____ | _____ | _____ |
| 41 Hot Unit | _____ | _____ | _____ |
| 42 Protector Case | _____ | _____ | _____ |
| 43 Milk Cooler | _____ | _____ | _____ |
| 44 Display Case, Refrigerated | _____ | _____ | _____ |
| 45 St. St. Work Table | _____ | _____ | _____ |
| 46 Lockers | _____ | _____ | _____ |
| 47 Milk Cooler | _____ | _____ | _____ |
| 48 Spare - Not Used | _____ | _____ | _____ |
| 49 Field Erection Labor | _____ | _____ | _____ |

Sales Tax _____

Total Base Bid Amount _____

SECTION 11 6143 - STAGE CURTAINS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Stage curtain fabrics.
- B. Linings.
- C. Stage curtain track support systems.

1.02 REFERENCE STANDARDS

- A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM A391/A391M - Standard Specification for Grade 80 Alloy Steel Chain 2007 (Reapproved 2012).
- D. ASTM A413/A413M - Standard Specification for Carbon Steel Chain 2007 (Reapproved 2012).
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2019a.
- F. FM (AG) - FM Approval Guide current edition.
- G. ITS (DIR) - Directory of Listed Products current edition.
- H. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2019.
- I. UL (DIR) - Online Certifications Directory Current Edition.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide for each type of product as follows:
 - 1. Stage Curtains: Provide information on type of curtain, weight, location for use on project, and type of flame retardancy.
 - 2. Tracks: Provide capacity of each curtain track to support curtain weight and control curtain operation.
- C. Shop Drawings: Indicate installation information for components not dimensioned or detailed in product data.
 - 1. Submit floor plans, elevations, sections, attachment details of curtains and operating clearances.
 - 2. Submit fabric assembly and support details.
 - 3. Submit documentation indicating load capacity of each batten, track, attachment, and rigging components.
- D. Selection Samples: Submit color chart for each type of stage curtain indicated that includes full range of colors, textures, and patterns available, along with 12 inch square fabric sample, in any color, of each fabric type and seam.
- E. Verification Samples: Submit fabric full width by at least 12 inch long section of each selected fabric from dye lot to be used for this work, with specified treatments applied and showing repeat of patterns; mark top and face of fabric.
- F. Certificate: Certify that products of this section meet or exceed specified requirements.
- G. Delegated Design Data: Indicate stage curtain system structural attachments, including analysis data signed and sealed by qualified designer responsible for their preparation.
- H. Designer's Qualification Statement.
- I. Manufacturer's Qualification Statement.

- J. Installer's Qualification Statement.
- K. Operation and Maintenance Data: For stage curtains and rigging operations.
- L. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 **QUALITY ASSURANCE**

- A. Designer Qualifications: Perform design of track support system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with minimum 5 years of documented experience.

1.06 **FIELD CONDITIONS**

- A. Ambient Conditions: Do not install stage curtains until spaces are fully enclosed and watertight, and the following:
 - 1. Wet work in adjacent areas is complete and surfaces are dry.
 - 2. Work at and above ceiling level has been completed.
 - 3. Ambient temperatures and humidity of adjacent areas are maintained at levels when occupied for intended use.
- B. Field Measurements: Confirm supporting structural element locations and adjacent construction for stage curtains and rigging, and complete field measurements prior to fabrication and include these dimensions on shop drawings.

1.07 **WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
 - 1. Defective Work includes, but is not limited to, stage curtain support and rigging that is not operating properly.

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

2.02 **PERFORMANCE REQUIREMENTS**

- A. Stage Curtain Systems Design: Engage qualified designer to develop design of stage curtain system, including comprehensive project specific analysis of necessary structural system attachments in compliance with performance requirements.
- B. Structural Performance: Ensure attachment of stage curtain system to structure withstands material weight and operational loads applicable for this project and in compliance with local building codes and authorities having jurisdiction.
 - 1. Design Loads: Weight of stage curtains and track system.
- C. Fire-Test Characteristics: Stage curtain fabrics in compliance with NFPA 701 flame propagation fire test requirements conducted by authorized testing agency, listed by UL (DIR), ITS (DIR), or FM (AG) and acceptable to authorities having jurisdiction.
 - 1. Permanently attach label to fabric of each curtain assembly indicating fabric treatment as follows:

2.03 **STAGE CURTAIN FABRICS**

- A. Provide curtains of matching fabric and color from single dye lot, and when size and quantity of curtains exceeds maximum dye lot size, provide curtain or adjacent pair of curtains from only one dye lot, and arrange curtain dye lots to minimize exposure of any differences.
- B. Polyester Velour Fabric: Weighing at least 17 ounces/linear yard, woven fabric of 100 percent Trevira CS Polyester and 54 inch minimum width.

1. Application: Main Traveler, Olio Legs and Cyclorama Traveler curtains.
2. Color:
 - a. Main Traveler (A) - Lark (6)
 - b. Olio Legs and Cyclorama Traveler (B) - Phoebe (22)
3. Products:
 - a. Knoll Textiles, Utmost II: www.knoll.com.

2.04 LININGS

- A. Type LA - Light-Weight Polyester Lining: Weighing at least 10 ounces/linear yard, 100 percent polyester fabric; 72 inch minimum width.
 1. Color: Match curtain color.
 2. Products:
 - a. Knoll Textiles: www.knoll.com.

2.05 CURTAIN TRACK

- A. Steel Track: Commercial quality, roll-formed, galvanized steel sheet, ASTM A653/A653M, with G60 coating designation; with continuous bottom slot and each half of track in single continuous piece; black paint finish; including support and operation accessories.
 1. Thickness: As recommended by manufacturer for curtain loads and operation.
 - a. Heavy-Duty: 14 gage, 0.0747 inch minimum thickness.
- B. Curtain Rails: Provide single or double curtain capacity as indicated on drawings, and end stops.
- C. Clamp and Bracket Hangers: Steel clamps and brackets of required strength to support loads for attaching track to overhead support.
- D. Track-Lap Clamp: Clamp that matches track channel finish as necessary for attaching two tracks at center overlap.
- E. Operation:
 1. Manual Cord Operation: Curtain track with cord, pulleys, and floor pulley; must manually open and close the curtain.
 - a. Operating Line: 3/8 inch diameter, stretch-resistant operating cord with braided synthetic-fiber cover over solid, synthetic-fiber, linear filaments.
 - b. End Pulleys: One single dead-end and one double live-end pulley, with sheaves having shielded ball bearings housed in plated-steel covers that match track finish, and provide with bracket for securing off-stage end of curtain.
 - c. Floor Pulleys: Sheave, adjustable type with 3 inch (76 mm) diameter wheels, and having shielded ball bearings housed in plated-steel covers, painted black.
- F. Track System: Provide heavy-duty curtain track with components as recommended by manufacturer for loads and operation, including track end stops.
 1. Carriers: Standard plated-steel carriers with a pair of nylon tired ball-bearing wheels riveted parallel to body, and equip carriers with rubber or neoprene bumpers to reduce noise and plated-steel swivel eye and trim chain for attaching curtain snap or S-hook, and required number of curtain carriers for track length and curtain fabrication.
 - a. Master Curtain Carriers: One plated-steel master carrier for each leading curtain edge, with two pairs of nylon tired ball-bearing wheels and with two line guides per carrier.
 2. Pulleys: One dead-end, single-wheel pulley; one live-end, double-wheel pulley; and one adjustable pulley to maintain proper tension on operating line; each with molded-nylon-tired ball-bearing sheaves enclosed in steel housings; pulleys with steel housing finished to match track and with bracket for securing off-stage end of curtain.

2.06 FABRICATION - CURTAINS

- A. General: Provide vertical seams unless otherwise indicated, locate vertical seams so they do not fall on faces of pleats, and only use fabric that is cut greater than half the width of fabric.
 1. Facing the full width of material at center meeting edges.

2. 1-1/2 inch clearance from floor at bottom of curtain.
 3. Curtains that overlap 36 inch at the center.
 4. Curtains that extend 24 inch on each side beyond full width of proscenium opening.
- B. Vertical and Top Hems: Machine sew hems as follows, unless otherwise indicated:
1. Vertical Hems: Fabricate at least 2 inch wide, and at least 4 inch wide at borders, valances, teasers, and tormentors with at least 1 inch tuck and without visible selvedge material from front of curtain; sew open ends of hems closed.
 2. Turnbacks: Fabricate leading-edge and trailing-edge turnbacks for traveler curtains by folding back at least 12 inch of face fabric, with at least 1 inch tuck, and vertically secured by sewing.
 3. Top Hems: Fabricate by double-stitching 3-1/2 inch wide, heavy jute or laminated synthetic webbing to top edge at back side of curtain with at least 2 inch of face fabric turned under.
- C. Fullness:
1. 50 Percent Fullness: Provide this fullness, exclusive of turnbacks and hems, and spaced at 12 inch on center along top hem reinforcement as follows:
- D. Grommets:
1. Black Colored Curtains: No. 3 brass, No. 4 brass, or aluminum grommets with black finish.
 2. Flat Curtains: No. 3 brass grommets at 12 inch on center and 1 inch from corner of curtain; for ties, snap hooks, or S-hooks.
 3. Pleated Curtains: Provide grommets centered on each box pleat and placed 1 inch from corner of curtain; for snap hooks or S-hooks.
- E. Bottom Hems: Machine sew hems as follows, unless otherwise indicated:
1. For Curtains With Fullness:
 - a. Curtains That Don't Hang to Floor: Hems at least 3 inch deep, with weight tape, 3/4 inch, and open ends of hems sewn closed.
 2. Lining: Provide lining for curtain with matching fullness of face fabric and finished 2 inch shorter than face fabric, and sew or otherwise securely fasten lining to top hem of face fabric.

2.07 ACCESSORIES

- A. S-Hooks: Manufacturer's standard heavy-duty plated wire hooks, at least 2 inch long.
- B. Snap Hooks: Manufacturer's standard heavy-duty snap hooks, sewn into top edge of curtain.
- C. Tie Lines: No. 4 or No. 4-1/2 cord or braided soft cotton tape, colored to best match curtain; at least 5/8 inch wide by 36 inch long and threaded through grommets.
- D. Battens: Fabricate using steel pipe and minimize the number of joints; connect pipe at joints using 18 inch long internal splice sleeve secured with four flush rivets, plug welds, threaded couplings, or equally strong method.
 1. Steel Pipe: 1-1/4 inch nominal diameter, Grade A, Schedule 40 in accordance with ASTM A53/A53M.
 2. Finish: Matte black with 1 inch wide yellow colored stripe along center of each batten.
- E. Support, Clamps, and Anchors: Galvanized after fabrication sheet steel, Class B in accordance with ASTM A153/A153M; manufacturer's standard thickness.
- F. Trim and Support Cable: 1/4 inch diameter, 7x19 galvanized steel cable with minimum breaking load (MBL) of 7,000 lbs.
- G. Trim and Support Chain: Hardened alloy steel chain rated for overhead lifting, Grade 80 in accordance with ASTM A391/A391M.
- H. Inserts, Bolts, Rivets, and Fasteners: Manufacturer's standard and corrosion-resistant.
- I. Individual Curtain Bottom Weights: Curtain manufacturer's standard segmented weights in compliance with requirements for curtain type and location.

- J. Proof Coil Chain, Curtain-Bottom Weight: No. 8, zinc plated, 3/16 inch diameter, Grade 30 in accordance with ASTM A413/A413M.
- K. Weight Tape: Curtain manufacturer's standard continuous weight tape to suit each curtain fabric type and location.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with installer present, for compliance with requirements for supporting structural members, blocking, clearances, installation tolerances, and other conditions that may impact performance of stage curtain assembly.
- B. Examine placement and condition of inserts, clips, blocking, or other supports installed by others and for use in supporting track and battens of stage curtain assembly.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Install stage curtain assembly in accordance with curtain and track manufacturers written instructions.

3.03 INSTALLATION - CURTAIN

- A. Track Hung: Secure curtains to track carriers with S-hooks.
- B. Batten Hung: Secure curtains to pipe battens with S-hooks.

3.04 INSTALLATION - BATTENS

- A. Install battens by suspending at heights as indicated with trim and supports spaced as required to support loads; do not exceed 10 feet between supports.
 - 1. Cable Trim and Suoperapport:
 - a. Fasten cables securely to either structure or to inserts, eye screws, or other applicable devices that are appropriate for substrate and not subject to deterioration or failure with time or elevated temperatures.
 - b. Attach other end of cable to pipe clamps with turnbuckles, housed or fixed securely after adjustment to prevent loosening.
 - 2. Chain Support: Secure chain as required for application with load-rated terminations.

3.05 INSTALLATION - TRACK

- A. Mounting of Track Assembly:
 - 1. Ceiling Mounted: Provide ceiling supports for mounting track direct to ceiling structure and within intervals indicated in manufacturer's written instructions for on center spacing.
 - 2. Beam Mounted: Install track by suspending from beam clamps securely mounted to structural I-beam and within intervals indicated in manufacturer's written instructions for on center spacing.
 - 3. Wall Mounted: Install track by suspending from brackets securely mounted to wall construction and within intervals indicated in manufacturer's written instructions for on center spacing.
 - 4. Batten Mounted: Install track by suspending from pipe batten with manufacturer's acceptable track clamp hangers securely attached to batten pipe clamps and within intervals indicated in manufacturer's written instructions for on center spacing.
- B. Track Support Spacing: Comply with manufacturer's recommendations for applied loads, and not to exceed the following dimensions between track supports:
 - 1. Heavy-Duty Track: 6 feet, maximum.
- C. Install track for center-parting curtains with at least 24 inch overlap of track sections at center-line, and supported with track lap clamps.

3.06 CLOSEOUT ACTIVITIES

- A. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours of training.
 - 3. Location: At project site.

3.07 PROTECTION

- A. Protect installed stage curtain assembly from subsequent construction operations until Date of Substantial Completion.

END OF SECTION

SECTION 11 6623 - GYMNASIUM EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall safety pads.

1.02 DEFINITIONS

- A. NFHS: National Federation of State High School Associations.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard 2016.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- C. ASTM F2440 - Standard Specification for Indoor Wall/Feature Padding - 2018.
- D. NFHS (Guide) - Court and Field Diagram Guide current edition.
- E. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- C. Electrically Operated Equipment: Coordinate location and electrical characteristics of service connection.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories; include:
 - 1. Electrical characteristics and connection locations.
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include point loads and locations for attachment of gymnasium equipment to structure.
- D. Samples: Submit 3 samples 3 by 3 inches in size showing each color and finish selected.
- E. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified with minimum 5 years of documented experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original packaging with factory original labels attached.
- B. Store products indoors and elevated above floor; prevent warping, twisting, or sagging.
- C. Store products in accordance with manufacturer's instructions; protect from extremes of weather, temperature, moisture, and other damage.

1.08 FIELD CONDITIONS

- A. Environmental Limitations: Do not install equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Verify position and elevation of floor inserts and layout for gymnasium equipment.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer agrees to repair or replace components of gymnasium equipment that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Basketball backboard failures, including glass breakage.
 - b. Faulty operation of divider curtains and basketball backstops.
 - c. Faulty operation of volleyball standards and winches.
 - 2. Warranty Periods:
 - a. 10 years from date of Substantial Completion for basketball backboard safety pads.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. See drawings for sizes and locations, unless noted otherwise.
- B. Where mounting dimensions or sizes are not indicated, comply with applicable requirements of the following:
 - 1. National Federation of State High School Associations (NFHS) sports rules; NFHS (Guide).
- C. Provide mounting plates, brackets, and anchors of sufficient size and strength to securely attach equipment to building structure; comply with requirements of Contract Documents.

2.02 WALL SAFETY PADS

- A. Manufacturers:
 - 1. Basis-of-Design Product: The design for each item specified is based on the product named.
 - a. Provide either the product identified as "Basis of Design" or an equivalent product from one of the following:
 - 1) Draper, Inc.; www.draperinc.com.
 - 2) Bison/IPI; www.ipibybison.com.
 - 3) JayPro Sports, LLC; www.jayprosports.com.
 - 4) Performance Sports System; www.perfsports.com.
 - 5) Porter Athletic Equipment Company; www.porterathletic.com.
 - 6) Spalding Sports Equipment; www.spaldingequipment.com.
 - 7) Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Source Limitations: Obtain wall safety pads and basketball equipment from single source from single manufacturer.
- B. Wall Safety Pads: Padded wall panels attached in a continuous row.
 - 1. Construction: Fabric covered fill material laminated to backer board,
 - a. Backer Board: Minimum 1/2 inch thick plywood or oriented strand board.
 - b. Fill: Fire-resistive, high impact-resistant, neoprene foam.
 - 1) Thickness: 2 inches, minimum.
 - 2) Density: 6 lb per cu. ft.
 - c. Fabric: Puncture and tear resistant, PVC-coated polyester or nylon-reinforced PVC fabric.
 - 1) Weight: 14-oz./sq. yd., minimum.
 - 2) Secure fabric to back of backer board.
 - 3) Fabric shall be free of sags and wrinkles.

- 4) Treat with fungicide for mildew resistance.
- 5) Colors: Two standard colors as selected by Architect.
2. Performance Requirements:
 - a. Complies with ASTM F2440 for impact protection.
 - b. Surface-Burning Characteristics: ASTM E84, Class A.
 - 1) Flame-Spread Index: 25 or less.
 - 2) Smoke-Developed Index: 450 or less.
3. Sizes:
 - a. Standard Padding:
 - 1) Width: 24 inches.
 - 2) Length: 72 inches.
 - b. L and C Shaped Padding:
 - 1) Manufacturer's standard L and C shapes for corners. Length to match standard padding.
 - c. Specially Shaped Padding: Custom fabricate special shapes and sizes to fit irregularly shaped members, areas, and protrusions in walls.
4. Cutout Trim: Provide manufacturer's standard flanged cutout trim kits for fitting pads around switches, receptacles, and other obstructions.
5. Mounting Method: Concealed Z-clips.
6. Locations: As indicated.
7. Basis-of-Design: Performance Sports Systems; Model 4130 Wall Pads with Model 4196 z-clips.

2.03 MISCELLANEOUS MATERIALS

- A. Associated Hardware, Support, and Fasteners:
 1. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard corrosion-resistant units; concealed; tamperproof, vandal-resistant design.
- B. Oriented Strand Board (OSB): PS 2.
- C. Particle Board: ANSI A208.1.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Take field measurements to ensure proper fitting of work. If taking field measurements before fabrication will delay work, allow for adjustments within recommended tolerances.
- B. Inspect areas and conditions before installation, and notify Architect in writing of unsatisfactory or detrimental conditions.
 1. Verify that supporting structure, subfloors, and other substrates are properly prepared to receive and support work of this section.
- C. Do not proceed with this work until conditions have been corrected; commencing installation constitutes acceptance of work site conditions.
- D. Verify that electrical services are correctly located and have proper characteristics.

3.02 INSTALLATION - GENERAL

- A. Install gymnasium equipment in accordance with Contract Documents and manufacturer's instructions.
- B. Install gymnasium equipment after other finishing operations, including painting, have been completed unless otherwise indicated.
- C. Coordinate installation of inserts and anchors that must be built in to flooring or subflooring.
- D. Install equipment rigid, straight, plumb, and level.
- E. Secure equipment with manufacturer's recommended anchoring devices.
 1. Fasteners and anchors shall properly transfer gymnasium equipment loads to structural supports.
- F. Separate dissimilar metals to prevent electrolytic corrosion.
- G. Electric Installation: Connect wiring to building electrical system.

3.03 WALL SAFETY PADS

- A. Install wall padding securely, with edges tight to wall and without wrinkles in fabric covering.
- B. Bottom of pads shall be 4 inches above finish floor unless otherwise indicated.
- C. Limit cuts in face of wall padding so that cuts are securely and fully concealed behind cutout trim.

3.04 ADJUSTING

- A. Verify proper placement of equipment.
- B. Verify proper placement of floor inserts; install volleyball standard posts and equipment and verify installation is proper and all equipment functions correctly.
- C. Perform operational tests of all operable equipment.
 - 1. Adjust operating equipment for proper operation; remove and replace equipment causing noise or vibration; lubricate equipment as recommended by manufacturer.
 - 2. Verify that limit switches are properly set.

3.05 CLEANING

- A. Remove masking or protective covering from finished surfaces.
- B. Clean equipment in accordance with manufacturer's recommendations.

3.06 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 11 6800 –PLAYGROUND EQUIPMENT

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 the manufactures product data for the playground equipment on the project site.

1.03 REFERENCES

- A. Manufacturer shall be ISO 9001/2008 certified
- B. Manufacturer shall show IPEMA certification of compliance for each component that the product conforms with the requirements of ASTM F1487-07ae1.
- C. Manufacturer shall show IPEMA certification of compliance for each component that the product conforms with the requirements of ASTM F1487-11.

PART 2 PRODUCTS

2.01 GENERAL SYSTEM SPECIFICATIONS:

- A. The uprights shall be factory drilled to ensure accurate placement of components and ease of installation. Field drilling and measuring are not required. GT Events are direct bolt products NOT a clamp system. All uprights shall receive factory installed aluminum post caps and shall be shipped with a factory applied label indicating proper surfacing level.
- B. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable.
- C. Manufacturer shall offer the following warranties on the materials and components of its system:
 - 1. - LIFETIME LIMITED WARRANTY ON SUPPORT POSTS (UPRIGHTS)
 - 2. - 15 YEAR LIMITED WARRANTY ON PUNCHED STEEL DECKS, PIPES, RAILS, LOOPS AND RUNGS
 - 3. - 15 YEAR LIMITED WARRANTY ON ROTOMOLDED POLYETHYLENE COMPONENTS
 - 4. - LIFETIME LIMITED WARRANTY ON POWERLOCK AND HARDWARE

2.02 SWINGS

- A. BELT SEAT WITH CLEVIS: Commercial Belt Seat - an extra piece of fluted rubber at the front and back of seat gives it a cushion bumper.
- B. SWING CLEVIS: Shall be 5/16" Dia. with galvanized finish. Bolt shall have tamper resistant head.
- C. CHAIN: (a) Material: 7/32" diameter steel wire. (b) Dimensions (inside for each link): 3/8" wide, 1-3/8" long. (c) Finish: Chain shall be hot dipped galvanized. (d) Type of construction: 4/0 welded link coil chain.

- D. COATED CHAIN: Shall be standard 7/32" diameter steel wire chain with a 1/8" (nominal) thickness of color-impregnated polyvinyl coating with U.V. inhibitors.
- E. STAINLESS STEEL CHAIN: (a) Material: 7/32" diameter steel wire. (b) Dimensions (inside for each link): 3/8" wide, 1-3/8" long. (c) Type of construction: 4/0 welded link coil chain.
- F. HARDWARE: All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel.
- G. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320 % longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing.

2.03 BENCHES

- A. BENCH SWING UPRIGHT: Shall be 3.5" outside diameter, 13 gauge (.095") galvanized round tubing, manufactured to ASTM A-500 Section II tolerances from cold-formed steel conforming to ASTM A-569 Sheet Spec. for Steel Coil. Minimum yield strength shall be 50,000 psi and minimum tensile strength shall be 55,000 psi. Upright shall be coated with a custom formula TGIC polyester powder coating in conformance with the specifications outlined herein.
- B. BENCH SWING: Bench shall be fabricated from 12 gauge (.109" thick) punched steel with a protective P & O finish. Arm rest and side frame shall be 1-1/2" O.D., 16 gauge (.065") wall galvanized tubing. Swing support shall be 1-1/2" O.D., 11 gauge (.120") wall galvanized pipe. Bench shall be a one-piece welded assembly and shall be coated with a custom formula TGIC polyester powder coating in conformance with the specifications outlined herein.
- C. HARDWARE: All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing.

2.04 GT EVENTS SPECIFICATIONS 2:

- A. The uprights shall be factory drilled to ensure accurate placement of components and ease of installation. Field drilling and measuring are not required. GT Events are direct bolt products NOT a clamp system. All uprights shall receive factory installed aluminum post caps and shall be shipped with a factory applied label indicating proper surfacing level.
- B. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable.

2.05 MOTION

- A. ROX ALL SEE SAW 3-1/2" MOLDED CAP: The 3-1/2" Molded Cap shall be constructed from injection molded Low Density Polyethylene.

- B. SENSORY WAVE SEAT: The Sensory Wave Seat shall be rotational molded from polyethylene. The polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotational molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D-155); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM-638); Flexural Modulus (ASTM- D-790); Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD)
- C. COATED SPINNING: The Coated Spinning shall be a 12 gauge (.109") steel spinning coated using an oven fused functionalized polyethylene copolymer-based thermoplastic. Fluidized bed coating application with superior mechanical performance, impact resistance and UV-stability.
- D. RUBBER SPRING: The Rubber Spring shall consist of rubber encapsulated by cast steel with a steel inner core.
- E. ROUND RUBBER SHROUD: The Round Rubber Shroud shall be molded EPDM with a 90 durometer.
- F. ROX ALL SEE SAW WELD ASS'Y: The Rox All See Saw Weld Assembly shall be a one-piece weldment constructed using 3-1/2" O.D. x .180" (7 gauge) wall galvanized steel tubing, 1-1/2" O.D. x .145" (SCH. 40) wall galvanized steel tubing, 1" O.D. x .133" (SCH. 40) wall galvanized steel tubing, 2" O.D. x .154" (SCH. 40) galvanized steel tubing, 2" O.D. .134 (10 Gauge) Galv. Wall Steel Tubing, 1/4" H.R. flat steel and 3/8" H.R. flat steel. The Rox All See Saw Weld Assembly shall be coated with a custom formula of TGIC polyester powder, after fabrication in conformance with the specifications outlined herein.
- G. FOOTBUCK WELD ASS'Y: The Footbuck Weld Assembly shall be a one piece weldment constructed using 5" O.D. x .180" (7 gauge) galvanized wall steel tubing, 3/16" H.R. flat steel, and 3/8" H.R. flat steel. Footbuck shall be coated with a custom formula of TGIC polyester powder, after fabrication in conformance with the specifications outlined herein.
- H. SPINNING SEAT HANDHOLD ASS'Y: The Spinning Seat Handhold Assembly shall be constructed out of 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing. Handhold shall be coated with a custom formula of TGIC polyester powder, after fabrication in conformance with the specifications outlined herein.
- I. POWDER COAT FINISH: Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTMD-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

- J. **HARDWARE:** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. NOTE: All weights are based on average comparisons of each part.
- K. **SPECIFICATIONS:** GAMETIME® has a policy of continuous improvement and reserves the right to discontinue or change specifications without notice.

2.06 CLIMBERS

- A. **DISCOVER CAVE:** Shall be 1/4" wall thickness double wall construction, color impregnated linear low density polyethylene and shall conform to the rotationally molded specifications outlined herein.
- B. **CONNECTOR PLATE:** Shall be fabricated from 1/4" x 4" hot rolled flat steel with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.
- C. **FOOTBUCK:** Shall be an all welded construction fabricated from 2 3/8" O.D. (13ga.) galvanized steel tubing and 12ga steel sheet. The footbuck shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.
- D. **HANDHOLDS:** Shall be manufactured from a hybrid resin mixture with custom formulated UV inhibitor.
- E. **HARDWARE:** All nuts, bolts, screws and lockwashers used in the assembly of all equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing.
- F. **ROTATIONALLY MOLDED:** Polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. Rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D-1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM-790); Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).
- G. **POWDER COAT FINISH:** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a six stage bath system with an iron phosphate wash, as a rust inhibitor, and a sealer to prevent flash rusting before coating. The coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: 3.0 - 5.0 mil thickness and oven cured between 375 to 425 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794-69), Wedge Bend (ASTM D-522-68).

- H. SPECIFICATIONS: GAMETIME © has a policy of continuous improvement and reserves the right to discontinue or change specifications without notice.

2.07 SWINGS

- A. PRIMETIME SWING TOPRAIL AND ARCH: Shall be fabricated of 3-1/2" O.D. (13 Gauge) galvanized steel tubing. Arch includes a welded 3-1/8" O.D. galvanized steel sleeve to which the toprail is fastened.
- B. FINISH: Shall be an electrostatically applied custom formula of TGIC polyester powder with baked finish. Specify color desired.
- C. HARDWARE: All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing.

2.08 SYMPHONY

- A. JAZZ COMBO
1. JAZZ FRONT HDPE PANEL AND JAZZ BACK HDPE PANEL: Shall be 1/2" thick high-density polyethylene.
 2. FORMED A MINOR PLATE AND FORMED C MAJOR PLATE: Shall be manufactured from 11 ga. hot rolled steel sheet.
 3. JAZZ COMBO PACKAGE: Shall be constructed of anodized aluminum chimes, foam damper, 1/4" - 20 x 2" I.D. SS U-Bolt w/Tygon Rubber, and 1/4" -20 SS Acorn Nut.
 4. SMALL UPRIGHT ASSEMBLY AND CURVED UPRIGHT ASSEMBLY: Shall be an all welded construction fabricated from 3-1/2" O.D. X .095" (13 gauge) wall galvanized steel tubing and 1/4" thick laser cut steel. The Small Upright Assembly and Curved Upright Assembly shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.
 5. MALLETT PACKAGE: Shall be an all plastic construction with stainless steel hardware.
 6. POWDER COAT FINISH: Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a six stage bath system with an iron phosphate wash, as a rust inhibitor, and a sealer to prevent flash rusting before coating. The coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: 3.0 - 5.0 mil thickness and oven cured between 375 to 425 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend(ASTM D-522-68),

7. **HARDWARE:** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. NOTE: All weights are based on average comparisons of each part.
8. **SPECIFICATIONS:** GAMETIME® has a policy of continuous improvement and reserves the right to discontinue or change specifications without notice

B. HARMONIC CHIMES

1. **HARMONIC CHIMES:** Each chime is made with heavy duty, anodized aluminum. Each instrument is supplied with four durable mallets with coated steel cables.
2. **SPECIFICATIONS:** GAMETIME® has a policy of continuous improvement and reserves the right to discontinue or change specifications without notice.

C. CONCERT TRIO

1. **CONCERT TRIO FRONT HDPE PANEL AND CONCERT TRIO BACK HDPE PANEL:** Shall be 3/4" thick high-density polyethylene.
2. **CONCERT TRIO 6, CONCERT TRIO 8, AND CONCERT TRIO 10:** Shall be constructed of 6" plastic pipe, 8", and 10" plastic pipe, and molded plastic lid.
3. **CONCERT TRIO RING ASSEMBLY:** Shall be an all welded construction fabricated from 3-1/2" O.D. X .095" (13 gauge) wall galvanized steel tubing and 1/4" thick laser cut steel. The Concert Trio Ring Assembly shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.
4. **CONCERT TRIO UPRIGHT SUPPORT:** Shall be an all welded construction fabricated from 3-1/2" O.D. X .095" (13 gauge) wall galvanized steel tubing and 1/4" thick laser cut steel. The Concert Trio Upright Support shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.
5. **SPACER WITH INSERTS:** Shall be fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing and 1.120" threaded insert. The Spacer shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.

6. **POWDER COAT FINISH:** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
7. **HARDWARE:** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. NOTE: All weights are based on average comparisons of each part.

D. MELODY CHIMES

1. **MELODY CHIMES FRONT HDPE PANEL AND MELODY CHIMES BACK HDPE PANEL:** The HDPE pieces shall be made from 3/4" thick (solid) high density, UV-stabilized and color impregnated polyethylene.
2. **MELODY CHIMES INSTRUMENT INSERT:** Shall be constructed of anodized aluminum chimes, plastic slats, and 3/8" thick pvc sheet.
3. **MELODY CHIMES SUPPORT ASSEMBLY:** Shall be an all welded construction fabricated from 2-3/8" O.D. x .095" (13 gauge) wall galvanized steel tubing, 1/4" thick laser cut plate, and 3-1/2" O.D. X .095" (13 gauge) wall galvanized steel tubing. The Melody Chimes Support Assembly shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.
4. **MELODY CHIMES SPACER:** Shall be fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing and threaded insert. The Melody Chimes Spacer shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.
5. **MALLET PACKAGE:** Shall be an all plastic construction with stainless steel hardware.

6. **POWDER COAT FINISH:** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
7. **HARDWARE:** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. NOTE: All weights are based on average comparisons of each part.
8. **SPECIFICATIONS:** GAMETIME® has a policy of continuous improvement and reserves the right to discontinue or change specifications without notice.

E. CANTATA CHIMES

1. **SMALL BRACKET PLATE:** Shall be fabricated from 11 Ga. 18" x 1/8" thick stainless steel. The Small Bracket Plate shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.
2. **LONG BRACKET PLATE:** Shall be fabricated from 11 Ga. 40" x 1/8" thick stainless steel. The Long Bracket Plate shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.
3. **CANTATA CHIMES FRONT HDPE PANEL AND CANTATA CHIMES BACK PANEL:** Shall be made from 3/4" thick (solid) high density, UV-stabilized and color impregnated polyethylene.
4. **CANTATA CHIMES INSTRUMENT INSERT:** Shall be constructed of anodized aluminum chimes, plastic slats, and 3/8" thick pvc sheet.
5. **CANTATA CHIMES SUPPORT ASSEMBLY:** Shall be an all welded construction fabricated from 2-3/8" O.D. x .095" (13 gauge) wall galvanized steel tubing, 3-1/2" O.D. X .095" (13 gauge) wall galvanized steel tubing, and 1/4" thick laser cut plate. The Cantata Chimes Support Assembly shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.
6. **CANTATA CHIMES SPACER:** Shall be fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing and threaded insert. The Cantata Chimes shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with specifications outlined herein.

7. Mallet Package: Shall be an all plastic construction with stainless steel hardware.
8. POWDER COAT FINISH: Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
9. HARDWARE: All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. NOTE: All weights are based on average comparisons of each part.
10. SPECIFICATIONS: GAMETIME® has a policy of continuous improvement and reserves the right to discontinue or change specifications without notice.

2.09 SWINGS

- A. ARCH SWING TOP RAIL ASSEMBLY The Top Rail is an assembly of roll formed 3 1/2" O.D. (.120" wall) galvanized pipe, 14 ga galvanized perforated infill and 1 1/2" x 3" rectangular tubing. The top rail shall be an all welded assembly and coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.
- B. LEG Each leg is manufactured from roll formed 3 1/2" O.D. (.120" wall) tubing. The legs shall be coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.
- C. SWING CONNECTOR The Swing Connector is an assembly of 1/4" thick hot rolled steel. The swing connector shall be an all welded assembly and coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.
- D. SEAT BUMPER - This will be 3 1/2" (90mm) OD textile reinforced high-pressure rubber hose, containing no external dye markings and covered with a wear and soil resistant surface.
- E. SWING SEAT - This will be a one-piece aluminum bowl, weighing with its bumper and pieces no more than 42 lbs (19 kg) empty.

- F. POWDERCOAT FINISH - Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a six stage bath system with an iron phosphate wash, as a rust inhibitor, and a sealer to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: 3.0 - 5.0 mil thickness and oven cured between 375 to 425 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 400 degrees Fahrenheit.

2.10 SLIDES

- A. ZIP SLIDES - DOUBLE BEDWAY PRIMETIME ALUMINUM UPRIGHTS: Shall be 3.5" outside diameter tubing, 1/8" wall thickness, extruded from 6005-T5 aluminum alloy conforming to ASTM-B-221. Minimum yield strength shall be 35,000 psi and minimum tensile strength shall be 38,000 psi. All upright posts shall have a finished grade line marking to indicate the correct playground safety surface level. All upright posts shall be coated with a custom formula TGIC polyester powder coating in conformance with the specifications outlined herein.
- B. DECK: The 24" x 45-1/2" rectangular deck shall be fabricated from 12 gauge (.109" thick) punched steel with a protective P&O finish. Intermediate supports are fabricated from 1/8" x 2 1/2" hot rolled steel. The deck shall be a one-piece welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". Deck shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating.
- C. LADDER: The ladder assembly shall be made from 11 gauge (.120" thick) punched steel. The steps and stringers shall be an all welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". The ladder shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The ladder handrail shall be fabricated of 1-5/16" O.D. galvanized pipe with a powder coat finish.
- D. BARRIER & ENTRY ENCLOSURES: The barrier enclosure shall be fabricated from 1-5/16" O.D., 14 gauge (.083") wall galvanized steel tubing. The vertical rungs shall be manufactured from 1-1/16" O.D., 15 gauge (.075") wall galvanized steel tubing. Mounting tabs shall be 1/8" hot rolled steel. The entry enclosure shall be fabricated from 1-5/16" O.D., 14 gauge (.083") wall galvanized steel tubing. The vertical rungs shall be manufactured from 1-1/16" O.D., 15 gauge (.075") wall galvanized steel tubing. Upright post shall be 1-5/16" O.D., 14 gauge (.083") wall galvanized steel tubing, and mounting tabs shall be 1/8" hot rolled steel. Both the barrier and entry enclosures shall be one-piece welded assemblies and shall be coated with a custom formula TGIC polyester powder coating in conformance with the specifications outlined herein.

- E. SLIDE: Zip Slides and hoods shall be color impregnated linear low-density polyethylene and shall conform to the rotationally molded specifications outlined herein with double wall construction molded to a minimum .25" wall thickness. Double bedway Zip Slides shall have a minimum inside bed width of 16.5" on each bedway. Outside rails are at least 7" high when measured from the centerline of the bedway surface. The angle of descent shall be no greater than 50°. Each Zip Slide works in conjunction with a rotationally molded hood that has an integrated cross bar which force users to a seated position. The exit section of the bedway shall have a minimum 40" radius for a smooth transition from the slide chute to the run-out area. The run-out shall be angled at a maximum of 4° with an integrated drain at 5° to reduce pooling of water. Zip Slides bolt directly to the deck and to the slide hood.
- F. HARDWARE: All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing.

2.11 POWERSCAPE SPECIFICATIONS

- A. PowerScape® features 5" O.D. uprights with a positive bolt-through TRU-LOC fastening system. The uprights shall be factory drilled to ensure accurate placement of components and ease of installation. Field drilling and measuring are not required. PowerScape® is a direct bolt system NOT a clamp system. All uprights shall receive factory installed aluminum post caps and shall be shipped with a factory applied label indicating proper surfacing level.
- B. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable. All climbing attachments shall include a 15" wide deck entryway or archway to control deck access to one child at a time and help prevent inadvertent falls.
- C. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable. All climbing attachments shall include a 15" wide deck entry archway to control deck access to one child at a time and help prevent inadvertent falls.
- D. Manufacturer shall offer the following warranties on the materials and components of its system:

2.12 ROOFS & ARCHES:

- A. TIN ROOF The Tin Roof Mega Hex, Tin Roof Gable Filler, Tin Roof End Gable, Tin Roof Cross Gable, Tin Roof Gable, Tin Roof Wide Pentagonal, Tin Roof 4 Wide Tri, Tin Roof Hex, and Tin Roof 4 Square panels shall be fabricated from a formed 14 gauge galvaneal sheet. The Upright Caps shall be fabricated from 3/16" thick hot rolled steel plate, 1/8" thick hot rolled steel plate, and 5" O.D. x .12" galvanized steel pipe. The Roofs Panels and Upright Caps shall be coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein, after fabrication.

2.13 GENERAL SPECIFICATIONS OF MATERIALS

- A. ARCHWAY 3D The Archway shall be fabricated of 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing, 3/16" Hot Rolled Mounting Tab and .083" (14 gauge) punched galvanized steel in-fill. The Archway shall be an all welded assembly and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein. The HDPE Trim shall be made from 1/2" thick (solid) high density, UV-stabilized and color impregnated polyethylene.
- B. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.14 UPPER BODY DEVELOPMENT COMPONENTS:

- A. CRUNCH BAR Shall be fabricated from 1-1/16" O.D. x .075"(15 gauge) wall galvanized steel tubing and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.

2.15 GENERAL SPECIFICATIONS OF MATERIALS

- A. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.16 PANELS:

- A. **CONTOURED SEAT** The contoured seat panels shall be fabricated from 11 gauge (.120") galvanized steel. The contoured seat panel frame shall be fabricated from 1-5/16" x 14 gauge (.083") wall and 1-1/16" x 15 gauge (.075") wall galvanized steel tubing. The contoured seat shall be an all welded assembly powder coated after fabrication with a custom formula of TGIC polyester in conformance with the specifications outlined herein.

2.17 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.18 IONIX SPECIFICATIONS

- A. **General System Specifications:** IONiX® features 3 1/2" O.D. uprights with a positive bolt-through fastening system utilizing stainless steel tabs. Field drilling and measuring are not required. IONiX is a direct bolt system NOT a clamp system. All uprights shall receive factory installed labels indicating proper surfacing level.

2.19 FREESTANDING

- A. **HEX POD STEP** The Hex Pod Pipe Support shall be fabricated from 3.5" outside diameter, 13 gauge (.095") galvanized round tubing with a mounting plate made from 3/16" thick hot rolled steel. The Hex Pod Pipe Support shall be a welded assembly and shall be coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein, after fabrication. The rotomolded step shall be color impregnated linear low-density polyethylene and shall conform to the rotationally molded specifications outlined herein with double wall construction molded to a minimum .25" wall thickness. The Hex Pod surface shall be 3/4" thick (solid) high density, UV-stabilized, laminated and color impregnated polyethylene.

2.20 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. **HARDWARE** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScope Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.
- C. **ROTATIONALLY MOLDED PRODUCTS** All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790);Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).

2.21 U-FRAMES

- A. **TRON CLIMBER** Tron Climber The U-Frame shall consist of all weld assemblies that shall be fabricated from 3 ½" O.D. x .095" wall galvanized pipe, purchased 3/16" Hot Rolled tab, and purchased coped 2.375" O.D. x .134" wall thickness SCH 40 galvanized pipe. The U-Frame weld assemblies shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein. The HDPE Trim shall be made from ¾" thick (solid) high density, UV-stabilized and color impregnated polyethylene. The handholds shall be manufactured from a hybrid resin mixture with custom formulated UV inhibitor

2.22 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. **HARDWARE** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScope Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.
- C. **HEX TOPPER** Shall be color impregnated linear low-density polyethylene and shall conform to the rotationally molded specifications outlined herein with single wall construction molded to a minimum .25" wall thickness.
- D. **ROTATIONALLY MOLDED PRODUCTS** All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790);Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).

2.23 OVERHEAD LINKS

- A. **ZIGGY RAIL** The Ziggy Rail and Compact Ziggy Rail shall be fabricated from formed 2.375" O.D. x .165" (8 gauge) galvanized steel pipe, and 1.029" O.D. galvanized pipe. The Ziggy Rail and Compact Ziggy Rail shall be an all welded assembly and shall be coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein, after fabrication.

2.24 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. **HARDWARE** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScope Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.

2.25 SIGNATURE COMPONENTS

- A. **VESSEL** The Vessel shall contain welded rung assemblies fabricated of 1-5/16" O.D. x .083" (14 gauge) wall galvanized pipe and 3/16" Hot Rolled Mounting Tab. The Vessel uprights shall be fabricated from 3 1/2" O.D. x .095" wall galvanized pipe and purchased coped 2.375" O.D. x .134" wall thickness SCH 40 galvanized pipe. The Vessel uprights and all welded assemblies and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.

2.26 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. **HARDWARE** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScape Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.

2.27 POWERSCAPE SPECIFICATIONS

- A. PowerScape® features 5" O.D. uprights with a positive bolt-through TRU-LOC fastening system. The uprights shall be factory drilled to ensure accurate placement of components and ease of installation. Field drilling and measuring are not required. PowerScape® is a direct bolt system NOT a clamp system. All uprights shall receive factory installed aluminum post caps and shall be shipped with a factory applied label indicating proper surfacing level.
- B. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable. All climbing attachments shall include a 15" wide deck entryway or archway to control deck access to one child at a time and help prevent inadvertent falls.
- C. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable. All climbing attachments shall include a 15" wide deck entry archway to control deck access to one child at a time and help prevent inadvertent falls.
- D. Manufacturer shall be ISO 9001/2008 certified
- E. Manufacturer shall show IPEMA certification of compliance for each component that the product conforms with the requirements of ASTM F1487-11.

- F. **ROTATIONALLY MOLDED PRODUCTS** All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790); Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).

2.28 PANELS:

- A. **SINGLE GIZMO PANEL** Gizmo panel shall be 2-1/2" thick, color impregnated linear low density polyethylene and shall conform to the rotationally molded specifications outlined herein. The Pipe Connector shall be an all welded structure fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing and 3/16" stainless steel. The Pipe Connector shall be coated with a custom formula of TGIC polyester powder, after fabrication in conformance with the specifications outlined herein. Gizmo's shall conform to the Gizmo specifications outlined herein.
- B. **GIZMO'S** The Wheel Housing, Window Housings and Cap shall be injection molded from color impregnated high density polyethylene. The Maze Bubble shall be injection molded from clear ABS plastic. The Echo Chamber, Answer Wheel, Knob, Maze, and Click Wheel shall be injection molded from color impregnated ABS plastic. The Bushing shall be injection molded Acetal. The Bubble Mirror shall be vacuumed formed of 3/16" thick polycarbonate with a mirror finish applied to the concave side. The Flat Mirror shall be 1/8" thick Polycarbonate with a mirror finish applied to one side. The Stained Glass shall be 3/16" translucent Polycarbonate.

2.29 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. **ENTRYWAY 3D** Entryway shall be fabricated of 1-1/16" O.D. x .075" (15 gauge) and 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing, 3/16" Hot Rolled Mounting Tab and .083" (14 gauge) punched galvanneal steel in-fill. The Entryway shall be an all welded assembly and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein. The HDPE Trim shall be made from 1/2" thick (solid) high density, UV-stabilized and color impregnated polyethylene.

2.30 CLIMBERS:

- A. **SCRAMBLE UP CLIMBER** Scramble Up climber shall be a one piece weld assembly with the main rail fabricated from 1 1/16" O.D. x .072" wall galvanized steel tubing. The straight tab shall be fabricated from 1/8" hot rolled steel. The formed mounting tab shall be fabricated from 3/16. The scramble up weld assembly shall be coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.
- B. The scramble up panel shall be fabricated from 3/4" thick (solid) high density, UV-stabilized, laminated and color impregnated polyethylene.
- C. The formed tab for panel attachment shall be fabricated from 1/8" hot rolled steel and coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.

2.31 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.32 UPPER BODY DEVELOPMENT COMPONENTS:

- A. **TURNING BAR** The Turning Bar shall consist of an L-Shaped length of 1.66" OD x .083" (14 gauge) pipe. It shall be coated after fabrication with a custom formula of TGIC polyester powder in conformance with the specifications outlined herein. The Turning Bar is bolted to an upright with a mounting tab that is welded to the end of the pipe.

2.33 GENERAL SPECIFICATIONS OF MATERIALS

- A. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. ROTATIONALLY MOLDED PRODUCTS All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790);Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).

2.34 SLIDES:

- A. ZIP SLIDES (SINGLE & DOUBLE BEDWAY, AND RUMBLE & ROLL) Zip Slides and hoods shall be color impregnated linear low-density polyethylene and shall conform to the rotationally molded specifications outlined herein with double wall construction molded to a minimum .25" wall thickness. Single bedway Zip Slides shall have a minimum inside bed width of 17.5" while double bedway Zip Slides shall have a minimum inside bed width of 16.5" on each bedway. Outside rails are at least 7" high when measured from the centerline of the bedway surface. The angle of descent shall be no greater than 5°. Each Zip Slide works in conjunction with a rotationally molded hood that has an integrated cross bar which force users to a seated position. The exit section of the bedway shall have a minimum 40" radius for a smooth transition from the slide chute to the run-out area. The run-out shall be angled at a maximum of 4° with an integrated drain at 5° to reduce pooling of water. Zip Slides bolt directly to the deck and to the slide hood.

2.35 CLIMBERS:

- A. SLOPED FUNNEL CLIMBER 2 DK SPAN Weld Assemblies: Climber Barrier and guardrails shall be fabricated from 1/8" thick hot rolled steel tab, 1.315" O.D. x .083" (14 gauge) wall galvanized steel tubing and 1.029" x .075" (15 gauge) wall galvanized steel tubing vertical rungs. The protective barrier assembly shall be coated with a custom formula of TGIC polyester powder, after fabrication in conformance with the specifications outlined herein.
- B. HDPE Steps The HDPE Steps shall be made from 3/4" thick (solid) high density, UV-stabilized, laminated and color impregnated polyethylene.

2.36 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. **HARDWARE** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScape Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.

2.37 IONIX SPECIFICATIONS

- A. **General System Specifications:** IONiX® features 3 1/2" O.D. uprights with a positive bolt-through fastening system utilizing stainless steel tabs. Field drilling and measuring are not required. IONiX is a direct bolt system NOT a clamp system. All uprights shall receive factory installed labelS indicating proper surfacing level.

2.38 FREESTANDING

- A. TRINET (MEDIUM) The Upright Supports shall be constructed of 3.5" O.D. X 0.095" galvanized pipe. The upright with socket weld assembly shall be constructed from 3.5" O.D. X 0.095" thick galvanized pipe and 2.375" O.D. X 0.095 galvanized pipe. The net connector weld assembly shall be constructed from 3.5" O.D. X 0.095" thick galvanized pipe and 1" X 1/4" X 1/4" thick H.R. Steel tabs. The left and right weld rail weld assembly shall be constructed from 2.375" O.D. X 0.095" thick galvanized pipe and 1" X 1/4" X 1/4" thick H.R. Steel tabs. Climber assembly shall be constructed of 1.66" O.D. 0.83" thick galvanized pipes. The Top Assembly shall be constructed of 3 1/2" O.D. X 0.095 galvanized pipes and 2.375" O.D. X 0.95 pipe and 1" X 1/4" X 1/4" thick H.R. Steel tabs. All Aluminum casting shall be manufactured with die casting A356 alloy. All the assemblies shall be welded constructions and coated with a custom formula of TGIC polyester powder coating after fabrication. The HDPE pieces shall be made from 3/4" thick (solid) high density, UV-stabilized and color impregnated polyethylene. The cable shall be 18mm diameter UV protected Polyamide Nylon rope with breaking load greater than or equal to 79.82KN. 6 strands each containing 19 steel reinforcement (0.6mm strands within a Polyamide sleeve wrapped around a reinforced steel core containing 6 strands each containing 19 steel reinforces 0.4mm steel strands.)

2.39 GENERAL SPECIFICATIONS OF MATERIALS

- A. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. HARDWARE All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScape Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.

2.40 POWERSCAPE SPECIFICATIONS

- A. General System Specifications: PowerScape® features 5" O.D. uprights with a positive bolt-through TRU-LOC fastening system. The uprights shall be factory drilled to ensure accurate placement of components and ease of installation. Field drilling and measuring are not required. PowerScape® is a direct bolt system NOT a clamp system. All uprights shall receive factory installed aluminum post caps and shall be shipped with a factory applied label indicating proper surfacing level.
- B. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable. All climbing attachments shall include a 15" wide deck entryway or archway to control deck access to one child at a time and help prevent inadvertent falls.
- C. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable. All climbing attachments shall include a 15" wide deck entry archway to control deck access to one child at a time and help prevent inadvertent falls.

2.41 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. TRANSFER PLATFORM 3D The Transfer Platform shall be fabricated of 1.029" O.D. x .072" wall galvanized pipe, 1-5/16" O.D. x .083" wall galvanized pipe, 14 Gauge x 1.5" galvanized steel purchased pipe cap, 3/16" Hot Rolled Mounting Tab and .083" (14 gauge) punched galvanneal steel in-fill. The Transfer Platform shall be an all welded assembly and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein. The HDPE Trim shall be made from 1/2" thick (solid) high density, UV-stabilized and color impregnated polyethylene.

2.42 GENERAL SPECIFICATIONS OF MATERIALS

- A. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.43 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **PUNCHED STEEL DECKS AND PVC COATED COMPONENTS** All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain pthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.
- B. **DECKS, SQUARE** Shall have a minimum surface area of 2,381 square inches, maintaining a full 49" center to center spacing on the upright posts. The 49" square deck shall be fabricated in conformance with the punched steel specifications outlined herein. The deck frame shall be fabricated from 3/16" x 3-1/2" hot rolled steel with corner supports fabricated from 1/4" x 3-1/2" hot rolled steel. Intermediate supports, fabricated from 1/8" x 2-1/2" hot rolled steel, shall be notched and welded at the intersections forming a rigid 12" support grid underneath the entire deck surface. The deck shall be a one-piece welded assembly, coated after fabrication with an oven cured matte finish polyvinyl chloride (PVC) coating in accordance with the specifications herein. The square deck shall be directly bolted to the upright posts with eight 3/8" diameter button-pin-in-head, hex socket cap screws in accordance with the hardware specifications herein.

2.44 CLIMBERS:

- A. **STAINLESS STEEL CARGO NET WALL** The net assembly shall be constructed from stainless steel, 4/0 welded link chain. Cross members for the net shall be fabricated from 1 1/16" x .075" (15 ga.) wall stainless steel tubing. The net shall be a welded assembly. The net assembly shall attach to the top rail using 3/8" hardware. The anchoring system shall consist of formed 1 1/16" x .075" (15 gauge) wall galvanized steel tubing. The top rail shall be an all welded construction with a custom formula of TGIC polyester powder coating, after fabrication, in conformance with the specifications outlined herein

2.45 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM

D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.46 PANELS:

- A. **HAND CYCLER** The Hand Cyler frame shall be an all welded assembly fabricated from 1 ½" O.D. LW galvanized steel tubing and 1" O.D. LW galvanized steel tubing with 3/16" thick stainless steel tabs. The Hand Cyler frame shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein. The Hand Cyler disks shall be constructed of two 3/4" thick (2 color) high density, UV-stabilized and color impregnated polyethylene. The disks shall ride on three 1 ½" molded urethane skate wheels.

2.47 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH:** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.48 PANELS:

- A. **GADGET PANELS** Panel shall be color-impregnated linear low density polyethylene and shall conform to the rotationally molded specifications outlined herein. Gadgets shall be made from 3/4" thick (solid) high density, UV-stabilized and color impregnated polyethylene. Some Gadgets also include Chrome Plated Steel or Polycarbonate.

2.49 GENERAL SPECIFICATIONS OF MATERIALS

- A. **ROTATIONALLY MOLDED PRODUCTS** All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790);Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).

2.50 SLIDES:

- A. ZIP SLIDES (SINGLE & DOUBLE BEDWAY, AND RUMBLE & ROLL) Zip Slides and hoods shall be color impregnated linear low-density polyethylene and shall conform to the rotationally molded specifications outlined herein with double wall construction molded to a minimum .25" wall thickness. Single bedway Zip Slides shall have a minimum inside bed width of 17.5" while double bedway Zip Slides shall have a minimum inside bed width of 16.5" on each bedway. Outside rails are at least 7" high when measured from the centerline of the bedway surface. The angle of descent shall be no greater than 5°. Each Zip Slide works in conjunction with a rotationally molded hood that has an integrated cross bar which force users to a seated position. The exit section of the bedway shall have a minimum 40" radius for a smooth transition from the slide chute to the run-out area. The run-out shall be angled at a maximum of 4° with an integrated drain at 5° to reduce pooling of water. Zip Slides bolt directly to the deck and to the slide hood.

2.51 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. SLIDE TRANSFER The Platform shall each be made from 11 gauge punched steel with a protective p&o finish in conformance with the specifications outlined herein. The Platform and Steps shall each be a one-piece welded assembly finished with the matte PVC coating per the specifications herein. Handrails shall be all-welded assemblies, fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing, and shall be coated after fabrication with a custom formula of TGIC polyester powder in conformance with the specifications outlined herein.

2.52 GENERAL SPECIFICATIONS OF MATERIALS

- A. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.53 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. PUNCHED STEEL DECKS AND PVC COATED COMPONENTS All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain phthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.54 OVERHEAD LADDERS

- A. LADDER LOOP The Ladder Loop shall be fabricated from 2-3/8" O.D., 1.9" O.D., 1 5/16" O.D. galvanized tubing with 3/16" formed hot rolled steel mounting tabs. The vertical ladder is made of 1 5/16" O.D. galvanized tube with 1" O.D. galvanized tube rungs, and 3/16" thick steel tabs. The assemblies shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.

2.55 GENERAL SPECIFICATIONS OF MATERIALS

- A. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.56 PANELS:

- A. METAL RUNG ENCLOSURES The rung enclosure shall be fabricated of 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing. The vertical rungs shall be fabricated of 1-1/16" O.D. x .075" (15 gauge) wall galvanized steel tubing. The rung enclosure shall be an all welded assembly and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.
- B. STEERING WHEEL The plastic steering wheel shall be molded of a durable proprietary plastic. The steering wheel will withstand an impact of over 250 foot-pounds. The steering wheel is approximately 13-3/4" in diameter.

2.57 GENERAL SPECIFICATIONS OF MATERIALS

- A. ROTATIONALLY MOLDED PRODUCTS All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790);Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).
- B. THUNDERRING The ThunderRing is molded from a color impregnated linear low density polyethylene and shall conform to the rotationally molded specifications outlined herein. The ThunderRing bracket shall be an all welded steel structure and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.

2.58 CLIMBERS:

- A. RIDGE CLIMBER The Ridge Climber shall be constructed from impregnated linear low density polyethylene and shall conform to the rotationally molded specifications outlined herein. The mounting bracket shall be fabricated of 1/4" x 1" hot rolled steel. The foot buck shall be fabricated from 1 5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing. The mounting bracket, and foot buck assemblies shall be coated with a custom formula of TGIC polyester powder, after fabrication in conformance with the specifications outlined herein

2.59 GENERAL SPECIFICATIONS OF MATERIALS

- A. ROTATIONALLY MOLDED PRODUCTS All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790);Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).
- B. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

- C. ARCHWAY 3D The Archway shall be fabricated of 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing, 3/16" Hot Rolled Mounting Tab and .083" (14 gauge) punched galvanized steel in-fill. The Archway shall be an all welded assembly and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein. The HDPE Trim shall be made from 1/2" thick (solid) high density, UV-stabilized and color impregnated polyethylene.
- D. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.60 GT EVENTS SPECIFICATIONS

- A. General System Specifications: The uprights shall be factory drilled to ensure accurate placement of components and ease of installation. Field drilling and measuring are not required. GT Events are direct bolt products NOT a clamp system. All uprights shall receive factory installed aluminum post caps and shall be shipped with a factory applied label indicating proper surfacing level.
- B. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable.

2.61 BALANCING

- A. CATERPILLAR, 90° Caterpillar Climber Center Rail: Shall be fabricated from 3-1/2" O.D. 13 gauge (.095") galvanized round tubing and 1 1/16" O.D. x .075" (15 gauge) wall galvanized steel tubing and 3/16" thick hot rolled flat steel mounting tabs. The Caterpillar Climber shall be a one -piece welded assembly and shall be coated with a custom formula of TGIC polyester powder coating after fabrication.

Footboards: Shall be 5" wide x 20" long x 1-1/16" thick. Each footboard is comprised of an internal "C" channel insert, which is extruded from 6005-T5 aluminum (ASTM B221), and a supple outer coating made from tough EPDM rubber with a 58-62 durometer rating. The rubber coating is hermetically molded around the aluminum insert, providing an attractive slip resistant surface. Air cells are molded into the rubber coating along the wide sides of the footboards and serve as cushions.

2.62 POWERSCAPE SPECIFICATIONS

- A. General System Specifications: PowerScape® features 5" O.D. uprights with a positive bolt-through TRU-LOC fastening system. The uprights shall be factory drilled to ensure accurate placement of components and ease of installation. Field drilling and measuring are not required. PowerScape® is a direct bolt system NOT a clamp system. All uprights shall receive factory installed aluminum post caps and shall be shipped with a factory applied label indicating proper surfacing level.
- B. All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable. All climbing attachments shall include a 15" wide deck entryway or archway to control deck access to one child at a time and help prevent inadvertent falls.

All decks and components shall connect to support posts by means of a through-bolt connection for strong, durable connections. Deck/Collar attachments shall not be acceptable. All climbing attachments shall include a 15" wide deck entry archway to control deck access to one child at a time and help prevent inadvertent falls.

2.63 CLIMBERS:

- A. TOADSTOOL SEAT AND CLIMBER The toadstool shall be fabricated from GTX Engineered Rubber. The toadstool is 12-7/8" diameter x 12" high. The ground extension shall be fabricated from 2-3/8" O.D. x .095" (13 gauge) wall galvanized steel tubing. The bottom plate is constructed from 3/16" x 6" diameter hot rolled flat steel and 2-3/8" O.D. x .095" (13 gauge) wall galvanized steel tubing.
- B. SENSORY WAVE ROTOMOLDED PARTS: The sensory wave rotomolded components shall be one piece construction manufactured from linear low-density polyethylene material and shall conform to the rotationally molded specifications outlined herein. Polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. Rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D-1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790); Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).
- C. SENSORY WAVE FOOTBUCKS: The Sensory Wave footbucks shall be all weld assemblies fabricated from 3 1/2" O.D. X .095" (13 gauge) wall galvanized steel tubing and 1/4" Hot Rolled flat steel coated with TGIC powder coat outlined herein.
- D. POWDER COAT FINISH: Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a six stage bath system with an iron phosphate wash, as a rust inhibitor, and a sealer to prevent flash rusting before coating. The coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: 3.0 - 5.0 mil thickness and oven cured between 375 to 425 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68).

- E. **HARDWARE:** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment, shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 300 series stainless steel. Fasteners with yellow dichromate treatment have an electro deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing.

2.64 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **DECK CURB** The Deck Curb shall be constructed from 3/16" x 6" hot rolled steel with a 1/2" x 41" long hot rolled steel rod top piece. The deck curb shall be a one-piece welded assembly, coated after fabrication with an oven cured matte finish polyvinyl chloride (PVC) coating in accordance with the specifications herein.
- B. **PUNCHED STEEL DECKS AND PVC COATED COMPONENTS** All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain phthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.65 PANELS:

- A. **ASHIKO AND DJEMBE PANEL** The Ashiko and Djembe are molded from a color impregnated linear low density polyethylene and shall conform to the rotationally molded specifications outlined herein. The frame shall be an all welded steel structure and shall be coated after fabrication with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.

2.66 GENERAL SPECIFICATIONS OF MATERIALS

- A. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. ROTATIONALLY MOLDED PRODUCTS All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790);Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).

2.67 CLIMBERS:

- A. DOUBLE BUBBLE CLIMBER Double Bubble Climber shall be a one-piece welded assembly with the mounting bracket fabricated from 1/8" hot rolled steel. The foot buck shall be fabricated from 1.315" x .083" wall galvanized steel pipe. The connection pipe shall be fabricated from 1.315" x .083" wall galvanized steel pipe with a purchased threaded stainless steel insert. The pipe end cap shall be fabricated from 14 Gauge galvanized steel. The rungs and support shall be fabricated from 1.315" x .083" wall galvanized steel pipe. A custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein.

2.68 GENERAL SPECIFICATIONS OF MATERIALS

- A. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

- B. ROTATIONALLY MOLDED PRODUCTS All polyethylene shall be linear low-density material with UV-stabilized color and an anti-static compound additive. All rotationally molded products shall meet or exceed the following specifications: ASTM D-1248, type 2, class A and Federal specification LP-390C, type 1, class M, grade 2, category 3; Density (ASTM D- 1505); Brittleness Temperature (ASTM D-746); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790);Heat Distortion (ASTM-648); Low Temperature Impact (ARM-STD).

2.69 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. PUNCHED STEEL DECKS AND PVC COATED COMPONENTS All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain pthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.70 SLIDES:

- A. F5 SPIRAL SLIDE The slide shall be a double wall, one-piece construction of color impregnated rotationally molded linear low density polyethylene with a 1/4" nominal wall thickness. Sidewalls of the slide shall be at least 9 1/2" high, when measured from the sliding surface. The outside diameter of the slide shall be 54 1/4". The slide helix shall be a full 360° cycle and shall have a long horizontal run out, to slow the user, before exiting the slide. The hood shall be a double wall, one-piece construction of color impregnated rotationally molded linear low density polyethylene with a 1/4" nominal wall thickness. The slide platform shall be made from 11 gauge punched steel with a protective p&o finish in conformance with the specifications outlined herein. The platform shall each be a one-piece welded assembly finished with the matte PVC coating per the specifications herein. Handrails shall be fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing, with vertical members fabricated of 1-1/16" O.D. x .075" (15 gauge) wall galvanized steel tubing. Attachment rails shall be fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing and 3/16" hot rolled flat steel. The handrails and attachment rails shall be all welded assemblies and shall be coated with a custom formula of TGIC polyester powder coating in conformance with the specifications outlined herein, after fabrication. The slide mast shall be aluminum and permanently molded into the slide during the molding process. The slide shall include a ground socket to receive the mast and additional footback supports. All rotationally molded polyethylene products shall conform to the rotationally molded specifications outlined herein.

2.71 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **SLIDE TRANSFER** The Platform shall each be made from 11 gauge punched steel with a protective p&o finish in conformance with the specifications outlined herein. The Platform and Steps shall each be a one-piece welded assembly finished with the matte PVC coating per the specifications herein. Handrails shall be all-welded assemblies, fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing, and shall be coated after fabrication with a custom formula of TGIC polyester powder in conformance with the specifications outlined herein.

2.72 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.73 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **PUNCHED STEEL DECKS AND PVC COATED COMPONENTS** All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain pthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.74 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.75 PANELS:

- A. **STOREFRONT PANEL** The storefront panel shall be fabricated from 11 gauge (.120") cold rolled steel. The storefront panel frame shall be fabricated from 2" square x 14 gauge (.083") wall galvanized steel tubing. The shelf of the panel shall be an all welded assembly made from 1" x 2" rectangular x 14 gauge (.083") wall galvanized steel tubing. The storefront panel shall be an all welded assembly powder coated after fabrication with a custom formula of TGIC polyester in conformance with the specifications outlined herein.

2.76 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **DECKS, WIDE TRIANGLE** The wide triangle deck shall be fabricated in conformance with the punched steel specifications outlined herein. Corner supports shall be fabricated from 1/4" x 3-1/2" hot rolled steel. Intermediate supports shall be welded at the intersections forming a rigid support grid underneath the deck surface. The deck shall be a one-piece welded assembly, coated after fabrication with an oven cured matte finish polyvinyl chloride (PVC) coating in accordance with the specifications herein. Each wide triangle deck shall be directly bolted to the upright posts with six 3/8" diameter button-pin-in-head, hex socket cap screws in accordance with the hardware specifications herein.
- B. **PUNCHED STEEL DECKS AND PVC COATED COMPONENTS** All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain phthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.77 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.78 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **PUNCHED STEEL DECKS AND PVC COATED COMPONENTS** All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain phthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.79 RAMPS/CONNECTING WALKS:

- A. **WIDE RAMP** The ramp sections shall be fabricated from punched steel in conformance with the specifications outlined herein. The ramp sections shall be one-piece welded assemblies that is 49 5/16" wide and finished with the matte PVC coating per the specifications herein. The ramp support shall be fabricated from 3/16" x 3" hot rolled steel with 3/16" x 2 1/2" x 4 1/2" stainless steel formed mounting tabs. Handrails shall be fabricated from 1 11/16" O.D. x .083" (14 gauge) wall galvanized steel tubing outer frame, with vertical members fabricated of 1 5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing. The handholds shall be continuous and fabricated of 1 5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing with 1/8" x 1 1/2" x 3 15/16" stainless steel formed mounting tabs. The ramp support, handrails, and handholds shall be all welded assemblies and shall be coated after fabrication with a custom formula of TGIC polyester powder in conformance with the specifications outlined herein.

2.80 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.81 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **PUNCHED STEEL DECKS AND PVC COATED COMPONENTS** All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain phthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.82 RAMPS/CONNECTING WALKS:

- A. **WIDE RAMP** The ramp sections shall be fabricated from punched steel in conformance with the specifications outlined herein. The ramp sections shall be one-piece welded assemblies that is 49 5/16" wide and finished with the matte PVC coating per the specifications herein. The ramp support shall be fabricated from 3/16" x 3" hot rolled steel with 3/16" x 2 1/2" x 4 1/2" stainless steel formed mounting tabs. Handrails shall be fabricated from 1 11/16" O.D. x .083" (14 gauge) wall galvanized steel tubing outer frame, with vertical members fabricated of 1 5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing. The handholds shall be continuous and fabricated of 1 5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing with 1/8" x 1 1/2" x 3 15/16" stainless steel formed mounting tabs. The ramp support, handrails, and handholds shall be all welded assemblies and shall be coated after fabrication with a custom formula of TGIC polyester powder in conformance with the specifications outlined herein.

2.83 GENERAL SPECIFICATIONS OF MATERIALS

- A. **HARDWARE** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScape Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.
- B. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.84 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **PUNCHED STEEL DECKS AND PVC COATED COMPONENTS** All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain phthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.85 GENERAL SPECIFICATIONS OF MATERIALS

- A. THERMOFORMED PRODUCTS All polyethylene shall be an ultra high molecular weight material. All thermoformed molded products shall meet or exceed the following specifications: ASTM D-1248, Type III, Class A, Category 5 and ASTM D-4976 PE235; Density (ASTM D-1505); Melt Flow (ASTM D-1238); Tensile Values (ASTM D-638); Flexural Modulus (ASTM D-790); ESCR Value (ASTM D-1693); Vicat Temperature (ASTM D-1525); Brittleness Temperature (ASTM D-746). Complies with FDA Regulation 21 CFR 177.1520. Complies with FMVSS #302 @ >.060".

2.86 RAMPS/CONNECTING WALKS:

- A. WIDE RAMP The ramp sections shall be fabricated from punched steel in conformance with the specifications outlined herein. The ramp sections shall be one-piece welded assemblies that is 49 5/16" wide and finished with the matte PVC coating per the specifications herein. The ramp support shall be fabricated from 3/16" x 3" hot rolled steel with 3/16" x 2 1/2" x 4 1/2" stainless steel formed mounting tabs. Handrails shall be fabricated from 1 11/16" O.D. x .083" (14 gauge) wall galvanized steel tubing outer frame, with vertical members fabricated of 1 5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing. The handholds shall be continuous and fabricated of 1 5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing with 1/8" x 1 1/2" x 3 15/16" stainless steel formed mounting tabs. The ramp support, handrails, and handholds shall be all welded assemblies and shall be coated after fabrication with a custom formula of TGIC polyester powder in conformance with the specifications outlined herein.

2.87 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. PUNCHED STEEL DECKS AND PVC COATED COMPONENTS All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain pthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.88 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.89 RAMPS/CONNECTING WALKS:

- A. **ADA WIDE RAMP ATTACHMENT 3D** The ramp shall be fabricated from punched steel in conformance with the specifications outlined herein. The ramp sections shall be a one-piece welded assembly finished with the matte PVC coating per the specifications herein. The Ramp 3D Weld Assembly shall be fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing with vertical members fabricated of 1- 1/16" O.D. x .075" (15 gauge) wall galvanized steel tubing and 14 gauge punched still with protective p&o finish. The handrails shall be an all welded assembly and shall be coated after fabrication with a custom formula of TGIC polyester powder in conformance with the specifications outlined herein. The Hand Hold shall be fabricated from 1-5/16" O.D. x .083" (14 gauge) wall galvanized steel tubing and 1- 1/16" O.D. x .075" (15 gauge) wall galvanized steel tubing with 3/16" x 2" hot rolled steel tabs. The ramp support shall be fabricated from 3/16" x 3" hot rolled steel with 3/16" x 2 1/2" x 4 1/2" stainless steel formed mounting tabs. The Support pipe shall be fabricated from 2 3/8" O.D x .095 light wall galvanized steel pipe. The ramp trim shall be made from 1/2" thick (solid) high density, UV-stabilized and color impregnated polyethylene.

2.90 PUNCHED STEEL & COATED DECK COMPONENTS:

- A. **PUNCHED STEEL DECKS AND PVC COATED COMPONENTS** All punched steel products shall be fabricated from 11 gauge punched steel with a protective p&o finish. Coated products shall consist of a welded assembly with an oven cured matte finish polyvinyl chloride (PVC) coating with a minimum coating thickness of .080". All decks shall be exclusively dipped utilizing the DuraWear process with an extra thick coating on the top of the deck. The PVC coating shall have a hardness of Shore A 83 +/-5 normal durometer range. This material is classed as "Self Extinguishing", meets or exceeds automotive specifications NVSS302, and contains ultraviolet inhibitors to help prolong the life of the coating. The PVC coating shall contain pthalate levels in concentrations of 1/10 of 1% or lower. For ADA Ramp Accessible decks and ramps, the hole shall measure 1/4" diameter after coating. For standard decks and ramps, the hole size shall measure 1 1/4" diameter after coating.

2.91 GENERAL SPECIFICATIONS OF MATERIALS

- A. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.
- B. **HARDWARE** All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScope Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.
- C. **POWDER COAT FINISH** Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.92 UPRIGHTS & UPRIGHT ACCESSORIES:

- A. TRU-LOC CONNECTION The Tru-Loc shall incorporate an aluminum casting in a distinctive purpose mounting system that allows a rung panel to mount to the upright. The Tru-Loc connector will have a matching counterpart for flat panel connections. Each is bolted directly into the upright post through a factory located and installed connection and designed to eliminate protrusions. Each shall be die cast of 380 aluminum alloy, to resist corrosion. Minimum tensile strength shall be 45,000 psi, minimum yield strength shall be 22,000 psi. All connectors shall be coated with a custom formula of TGIC polyester powder coating, in conformance with the specifications outlined herein.
- B. UPRIGHTS, ALUMINUM Shall be 5"outside diameter tubing, 1/8" wall thickness, extruded from 6005-T5 aluminum alloy conforming to ASTM-B-221. Minimum yield strength shall be 35,000 psi and minimum tensile strength shall be 38,000 psi. All upright posts shall have a finished grade line marking to indicate the correct playground safety surface level. All upright posts shall be coated with a custom formula TGIC polyester powder coating in conformance with the specifications outlined herein.
- C. UPRIGHT CAPS The standard upright cap shall be an aluminum cap, cast from a 383 alloy, powder coated to match the upright. Every upright cap shall receive a primer coat for maximum protection. All upright caps are permanently installed at the factory using aluminum self-sealing rivets.

2.93 GENERAL SPECIFICATIONS OF MATERIALS

- A. HARDWARE All nuts, bolts, screws, inserts, and lockwashers used in the assembly of all play equipment shall be stainless steel, yellow dichromate plated steel, blue-coat plated steel, mechanically galvanized or powder coated/yellow dichromate plated steel. All primary fasteners shall be 304 alloy stainless steel. Fasteners with yellow dichromate treatment have an electro-deposited, 99.9% pure zinc substrate applied from a specially formulated solution sealed with a yellow dichromate top coat designed to work in conjunction with the zinc plating. Yellow dichromate has a 320% longer life to white corrosion and 275% longer to red corrosion than does hot-dip galvanizing. PowerScape Plus stainless steel fasteners shall be button pin-in head, hex socket cap screws with a two-part epoxy locking patch added to the threads. The two-part locking patch shall consist of one part resin and one part catalyst which are activated during installation. After curing, the material shall require a minimum of five times the installation torque to remove the fastener. Manufacturer shall provide special installation tools for pinned fasteners.

- B. POWDER COAT FINISH Shall be an electrostatically applied custom formula of TGIC polyester powder. All components will be free of sharp edges and excess weld spatter and shall be cleaned in a four stage solvent / zirconium based bath system (free of iron phosphate), as a rust inhibitor, and a zirconium conversion coating to prevent flash rusting before coating. In addition, all welds shall be protectively coated with ZRP, a zinc rich primer that forms a rust-resistant barrier layer over each weld prior to application of the powder coating. The powder coating shall have a super tough finish with maximum exterior durability and will have superior adhesion characteristics. Typical characteristics are: Two coat process to achieve 3.0 - 5.0 mil thickness and oven cured between 350 degrees Fahrenheit. Pencil Hardness H (ASTM D-3363), Impact (ASTM D-2794- 69), Wedge Bend (ASTM D-522-68), Adhesion (Cross Hatch ASTM D-3359 & Knife Scratch ASTM D-2197), Environmental (Stain Resistance ASTM D-1308, Humidity ASTM D-2247 - 87, Salt Spray ASTM B-117 & Fadometer 300 hrs with no loss of gloss), Over-bake Stability 100% at 350 degrees Fahrenheit for 10 minutes.

2.94 UPRIGHTS & UPRIGHT ACCESSORIES:

- A. TRU-LOC CONNECTION The Tru-Loc shall incorporate an aluminum casting in a distinctive purpose mounting system that allows a rung panel to mount to the upright. The Tru-Loc connector will have a matching counterpart for flat panel connections. Each is bolted directly into the upright post through a factory located and installed connection and designed to eliminate protrusions. Each shall be die cast of 380 aluminum alloy, to resist corrosion. Minimum tensile strength shall be 45,000 psi, minimum yield strength shall be 22,000 psi. All connectors shall be coated with a custom formula of TGIC polyester powder coating, in conformance with the specifications outlined herein.
- B. UPRIGHTS, ALUMINUM Shall be 5"outside diameter tubing, 1/8" wall thickness, extruded from 6005-T5 aluminum alloy conforming to ASTM-B-221. Minimum yield strength shall be 35,000 psi and minimum tensile strength shall be 38,000 psi. All upright posts shall have a finished grade line marking to indicate the correct playground safety surface level. All upright posts shall be coated with a custom formula TGIC polyester powder coating in conformance with the specifications outlined herein.

PART 3 EXECUTION

- A. Construct in accordance with manufacture's assembly instructions.

END OF SECTION

TMP ARCHITECTURE
Mitchell and Mouat Architects
MIDWESTERN CONSULTING

TMP19040
MaMA1909
MC 19147

SECTION 12 2216 - DRAPERY, TRACK AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed steel track.
- B. Nylon carriers, cords, and accessories.
- C. Drapes

1.02 REFERENCE STANDARDS

1.03 ADMINISTRATIVE REQUIREMENTS

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide track profiles, acceptable load data, finishes available, electrical characteristics and connection requirements, and Fabrics.
- C. Shop Drawings: Indicate end track location, width of window opening, location of blocking for anchors, appurtenances and interferences, adjacent construction, operating hardware, and support bracket details. Show size, locations, and detail of installation of Drapes.
- D. Maintenance Data: Include data for motor, shaft and gearing, lubrication frequency, control adjustments, spare part sources.
- E. Product Certificates: For each drapery fabric treated with flame retardant, signed by fabric supplier and indicating treatment durability and cleaning procedures required to maintain treatment effectiveness.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

1.05 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this section, with minimum three years of documented experience.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockup in locations and in sizes as directed by Architect
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 SAMPLES

- A. Drapery Tracks: 18 inches (450 mm) long, with carriers, controls, and accessories.
- B. Drapery Fabrics: For each color and pattern indicated, full width by 36 inches (1000 mm) long, from dye lot to be used for the Work and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.
- C. Textile Trims: For each color and pattern indicated, 18 inches (450 mm) long.

1.07 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before drape fabrication, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Drapery Track:
 - 1. Kirsch, Inc; Series 94001: www.kirsch.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Tracks: Formed steel, bi-parting operating traverse rods, regular duty channel track.
- B. Track Brackets: Formed steel wall type, for recessed installation, with screws and inserts for attachment.

- C. Carriers: Manufacturer's Standard
 - 1. Master Carriers: Overlap
- D. Tension Pulley: Nylon rollers in metal retainer, fixed with spring loaded tension wall bracket.
 - 1. Draw: Two way, center opening.
- E. Finishes: Baked Enamel, White.

2.03 DRAPES

- A. Source Limitations: Obtain each color and pattern of drapery fabric and trim from one dye lot.
- B. Fire-Test-Response Characteristics: For fabrics treated with fire retardants, provide products that pass NFPA 701 as determined by testing of fabrics that were treated using treatment-application method intended for use for this Project by a testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Drape:
 - 1. Heading:
 - a. Roll Pleats (Ripplefold): 100 percent fullness.
 - b. Pleat Spacing: 4 to 6 inches.
 - c. Heading Accessories:
 - 1) Hooks.
 - 2. Drapery Fabric:
 - a. Fabric:
 - 1) Manufacturer: DesignTex
 - 2) Product: Everywhere Texture (4147)
 - 3) Color: Soapstone (402)
 - 4) Width: 55 inches
 - b. Orientation: Run right (up to the bolt)
 - c. Textile Treatments: Stain repellent; and flame retardant, polymer type.
 - 3. Hem Weights: Tape type (string weights).

2.04 DRAPE FABRICATION

- A. Fabricate drapes in heading styles and fullnesses indicated. Fabricate headings to stand erect. If less than a full width of fabric is required to produce panel of specified fullness, use equal widths of not less than one-half width of fabric located at ends of panel.
 - 1. Center-Opening Drapes: Add 10 inches (254 mm) to overall width for overlap.
- B. Seams: Sew vertical seams with twin-needle sewing machine with selvage trimmed and overlapped. Join widths so that patterns match and vertical seams lay flat and straight without puckering. Horizontal seams are unacceptable.
- C. Side Hems: Double-turned, 1-1/2-inch- (38-mm-) wide hems consisting of three layers of fabric, and blindstitched so that stitches are invisible on face of drape.
- D. Bottom Hems: Double-turned, 4-inch- (102-mm-) wide hems consisting of three layers of fabric, and weighted and blindstitched so that weights and stitches are invisible on face of drape.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that concealed anchors are in correct position.

3.02 INSTALLATION

- A. Install drapery tracks in accordance with manufacturer's instructions, level and plumb, and at height and location in relation to adjoining openings as indicated on Drawings.
- B. Anchor tension pulley to wall.
- C. Where drapes extend to floor, install so that bottom hems clear finished floor by not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm).
- D. Where drapes abut overhead construction, hang drapes so that clearance between headings and overhead construction is 1/4 inch (6.4 mm).

3.03 ADJUSTING

- A. After hanging drapes, test and adjust each drapery track to produce unencumbered, smooth operation.
- B. Steam and dress down drapes as required to produce crease- and wrinkle-free installation.
- C. Remove and replace drapes that are stained or soiled.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

SECTION 12 2400 - WINDOW SHADES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manual roller shades.
- B. Motorized roller shades.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.
- B. Division 26 Sections: Electrical service and connections for motor operators, controls, limit switches, and other powered devices and for system disconnect switches for motorized shade operation..

1.03 REFERENCE STANDARDS

- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
- B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2019.
- D. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Where motorized shades are to be controlled by control systems provided under other sections, coordinate the work with other trades to provide compatible products.
 - 2. Coordinate the work with other trades to provide rough-in of electrical wiring as required for installation of hardwired motorized shades.
- B. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.
- C. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
 - 1. Motorized Shades: Include power requirements and standard wiring diagrams for specified products.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
 - 1. For schedule, use same designations as indicated on Drawings.
 - 2. Motorized Shades: Provide schematic system riser diagram indicating component interconnections. Include requirements for interface with other systems.
- D. Certificates: Manufacturer's documentation that line voltage components are UL listed or UL recognized.
- E. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- F. Samples:

1. Roller Shade Finishes: Submit 3 samples 2 by 3 inches in size for each color selected.
 2. Shade Material: Submit 3 samples, 4 by 4 inches in size, for each type, color, and finish.
 - G. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
 - H. Window Shade Samples: Representative of types in the project.
 1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated. Include all related accessories such as valances.
 - I. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.
 - J. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
 - K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
 1. See Section 01 6000 - Product Requirements, for additional provisions.
 2. Shade Fabric Panels: For each fabric, color and size, quantity equal to 2 percent of total installed, but not less than 2 panels.
 3. Drive Chain: Quantity equal to 2 percent of total installed, but not less than 100 lineal feet.
 4. Clutch Operator: Quantity equal to 2 percent of total installed, but not less than 2 units.
 5. Mounting Brackets: Quantity equal to 2 percent of total installed, but not less than 2 pair.
 - L. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.
- 1.06 **QUALITY ASSURANCE**
- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
 - B. Installer Qualifications: Company specializing in performing work of this type with minimum 5 years of documented experience with shading systems of similar size and type.
- 1.07 **MOCK-UP**
- A. Mock-Up: Provide full size mock-up of window shade system complete with selected shade fabric including example of seams and batten pockets when applicable.
 1. Full-sized mock-up may become part of the final installation.
- 1.08 **DELIVERY, STORAGE, AND HANDLING**
- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
 - B. Handle and store shades in accordance with manufacturer's recommendations.
- 1.09 **FIELD CONDITIONS**
- A. Do not install products under environmental conditions outside manufacturer's absolute limits.
- 1.10 **WARRANTY**
- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
 - B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 1. Shade Hardware: 10 years, excluding drive chains.
 2. Electric Motors: 5 years.
 3. Electronic Control Equipment: 5 years.
 4. Fabric: 10 years.
 5. Aluminum and Steel Coatings: One year.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Roller Shades:
 1. Draper, Inc.: www.draperinc.com.
 2. Hunter Douglas Architectural: www.hunterdouglasarchitectural.com.
 3. Lutron Electronics Co. Inc./Contract Roller Shades: www.lutron.com
 4. MechoShade Systems, LLC: www.mechoshade.com.

5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Provide roller shades by one manufacturer from a single source

2.02 ROLLER SHADES

- A. General:
 1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
 2. Provide shade system that operates smoothly when shades are raised or lowered.
 3. Motorized Shades: Motor system housed inside roller tube, controlling shade movement via motor controls indicated; listed or recognized to UL 325.
 - a. Comply with NFPA 70.
 - b. Electrical Components: Listed, classified, and labeled as suitable for the purpose intended. Where applicable, system components to be FCC compliant.
 - c. Motors: Size and configuration as recommended by manufacturer for the type, size, and arrangement of shades to be operated; integrated into shade operating components and concealed from view; fully compatible with controls to be installed.
 - d. Electrical Characteristics: 120 volts, single phase, 60 Hz, unless otherwise indicated.
- B. Roller Shades Type A: Manual, single roller, light-filtering.
 1. Description - Interior Roller Shades: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
 - a. Drop Position: Regular roll.
 - b. Roll Direction: Roll down, closed position is at window sill.
 - c. Mounting: As indicated.
 - d. Size: As indicated on drawings.
 - e. Fabric: RSF- 1
 - f. Finishes:
 - 1) For metal components exposed to view provide manufacturer's standard baked enamel finish.
 - 2) Colors of Metal and Plastic Components Exposed to View: Standard color as selected by Architect.
 2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Material: Stamped steel.
 3. Roller Tubes: As required for type of shade operation.
 - a. Material: Extruded aluminum.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge or double sided adhesive tape.
 4. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Exposed aluminum bottom bar, flat profile with closed ends.
 5. Manual Operation:
 - a. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
 - b. Drive Chain: Continuous loop beaded ball chain, 95 pounds minimum breaking strength. Provide upper and lower limit stops.
 - 1) Chain Material: Provide nickel-plated metal or stainless steel.
 - c. Shade Lift Assistance: Manufacturer's standard spring device contained in the idler end of roller tube, to reduce force required to lift shades; as required based on shade weight.
 - d. Chain Retainer:
 - 1) Manufacturer's standard clip.
 - e. Crank Operator: Manufacturer's standard material and design.

- 1) Heavy-Duty Two-Piece Crank Handle; 36" wall-mounted extension and 72" detachable crank handle
 - 2) Location: at Classrooms Only.
6. Accessories:
- a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to brackets without exposed fasteners.
 - 1) Profile: Square.
 - b. End Caps: Provide manufacturer's standard end caps to cover exposed ends of brackets.
 - c. Fasteners: Non-corrosive, and as recommended by shade manufacturer.
- C. Roller Shades Type B: Motorized, double roller, light-filtering and blackout/room-darkening.
1. Description - Interior Roller Shades: Double roller, motor operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
 - a. Drop Position: Regular roll.
 - b. Roll Direction: Roll down, closed position is at window sill.
 - c. Mounting: As indicated.
 - d. Size: As indicated on drawings.
 - e. Fabric: RSF- 1 and RSF-[2]
 - f. Finishes:
 - 1) For metal components exposed to view provide manufacturer's standard baked enamel finish.
 - 2) Colors of Metal and Plastic Components Exposed to View: Standard color as selected by Architect.
 2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Material: Stamped steel.
 - b. Double Roller Brackets: Configured for light-filtering and room-darkening shades in one opening.
 - 1) Light-Filtering Fabric: Room-side of opening.
 - 2) Room-Darkening Fabric: Glass-side of opening.
 - c. Multiple Shade Operation: Provide hardware as necessary to operate more than one shade using a single motor.
 3. Roller Tubes: As required for type of shade operation.
 - a. Material: Extruded aluminum.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge or double sided adhesive tape.
 4. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Exposed aluminum bottom bar, flat profile with closed ends.
 5. Accessories:
 - a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to brackets without exposed fasteners.
 - 1) Profile: Square.
 - b. End Caps: Provide manufacturer's standard end caps to cover exposed ends of brackets.
 - c. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

2.03 SHADE FABRIC

- A. Fabric RSF- 1: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 1. Products: Provide one of the following:
 - a. Mermet Corporation: E Screen: www.mermetusa.com.

- b. Phifer, Inc.: SheerWeave 2500: www.phifer.com.
 - c. Substitutions: Not permitted
 2. Material: Vinyl coated fiberglass.
 3. Performance Requirements:
 - a. UV Blockage: 95 percent, minimum.
 - b. Flammability: Pass NFPA 701 large and small tests.
 - c. Fungal Resistance: No growth when tested according to ASTM G21.
 4. Openness Factor: 1 percent.
 5. Roll Width: 63 inches, minimum.
 6. Color: Standard color as selected by Architect.
- B. Fabric RSF- 2: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 1. Products: Provide one of the following:
 - a. Mermet Corporation: Avila Twilight: www.mermetusa.com.
 - b. Phifer, Inc.:SheerWeave 7000 Blackout: www.phifer.com.
 - c. Substitutions: Not permitted
 2. Material: Vinyl coated polyester.
 3. Performance Requirements:
 - a. UV Blockage: 95 percent, minimum.
 - b. Flammability: Pass NFPA 701 large and small tests.
 - c. Fungal Resistance: No growth when tested according to ASTM G21.
 4. Openness Factor: 0 percent (Blackout).
 5. Roll Width: 63 inches, minimum.
 6. Color: Standard color as selected by Architect.

2.04 MOTOR CONTROLS

- A. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
- B. Provide all components and connections necessary to interface with other systems as indicated.
- C. Manual Motor Controls:
 1. Control Functions:
 - a. Open: Automatically open controlled shade(s) to fully open position when button is pressed.
 - b. Close: Automatically close controlled shade(s) to fully closed position when button is pressed.
 - c. Raise: Raise controlled shade(s) only while button is pressed.
 - d. Lower: Lower controlled shade(s) only while button is pressed.
 - e. Presets: For selection of predetermined shade positions.
 - f. Multiple Shade Groups: Provide individual controls for each shade group as indicated.

2.05 WARRANTY

- A. Furnish a twenty five year (25) manufacturer's guarantee against defects in material and workmanship from the date of substantial completion.

2.06 ROLLER SHADE FABRICATION

- A. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
 1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
 2. Horizontal Dimensions - Inside Mounting: Provide symmetrical light gaps on both sides of shade not to exceed 3/4 inch total.
 3. Horizontal Dimensions - Outside Mounting: Extend shades 2 inches beyond jambs on each side.

- B. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Electrical Connections: For motorized roller shades, verify proper electrical characteristics and connection locations.
- C. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Electrical Connections: Connect motorized roller shades to building electrical system.
- C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 SYSTEM STARTUP

- A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.

3.05 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.06 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.

3.07 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 3216 - MANUFACTURED PLASTIC LAMINATE-CLAD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured plastic laminate casework.
- B. Miscellaneous pieces including tables and mobile cabinets.
- C. Countertops.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking and nailers for anchoring casework.
- B. Section 07 9200 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.
- C. Section 09 2216 - Non-Structural Metal Framing: Reinforcements in metal-framed partitions for anchoring casework.
- D. Section 09 6500 - Resilient Flooring: Resilient wall base.

1.03 DEFINITIONS

- A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches above finished floor, tops of cases less than 72 inches above finished floor and all members visible in open cases or behind glass doors.
- B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches above finished floor and bottoms of cabinets more than 30 inches but less than 42 inches above finished floor.
- C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation, and bottoms of cabinets less than 30 inches above finished floor.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI A208.1 - American National Standard for Particleboard 2016.
- C. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use 2016.
- D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.
- E. ASTM C1036 - Standard Specification for Flat Glass 2016.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- G. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).
- H. BHMA A156.18 - American National Standard for Materials and Finishes 2016.
- I. BHMA A156.9 - American National Standard for Cabinet Hardware 2015.
- J. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2016.
- K. IAPMO Z124 - Plastic Plumbing Fixtures 2017.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- M. ISFA 2-01 - Classification and Standards for Solid Surfacing Material 2013.
- N. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material 2013.
- O. MIA (DSDM) - Dimensional Stone Design Manual, Version VIII 2016.
- P. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

- B. Keying Conference: Conduct conference prior to ordering keys. Incorporate conference decisions into keying submittal.
- C. Coordinate the work with placement of concealed framing, blocking, and reinforcements that support casework.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each product. Include component dimensions, configurations, construction details, joint details, attachments.
- C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include filler panels, rough-in and anchors, reinforcements, and blocking, placement dimensions and tolerances, clearances required, and keying information.
 - 1. Indicate manufacturer's catalog number for each unit of casework.
 - 2. Indicate plumbing locations and electrical service locations.
- D. Samples:
 - 1. Plastic Laminate: Submit 3 samples 3 by 6 inches in size showing each color, texture, and finish selected.
 - 2. Edge Banding: Submit 3 samples 6 inches in length showing each color and finish selected.
 - 3. Solid Surfacing: Submit 3 samples 4 by 4 inches in size, for each type, color, pattern, and finish.
- E. Selection Samples: Where colors and finishes are not specified, submit 3 sets of color and finish selection charts or chips.
- F. Casework Samples: Representative of types in the project.
 - 1. To be provided only upon request of Architect.
 - a. Base Cabinet: Cabinet with drawer and door and specified hardware.
 - b. Wall Cabinet: Cabinet with shelves and supports, door and specified hardware.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Door Hinges: For each type, quantity equal to 2 percent of total installed, but not less than 5; includes fasteners.
 - 3. Door Catches: Quantity equal to 2 percent of total installed, but not less than 5, includes fasteners.
 - 4. Door Pulls: For each type, quantity equal to 2 percent of total installed, but not less than 5; includes fasteners.
 - 5. Shelf Supports: Quantity equal to 2 percent of total installed, but not less than 10.
 - 6. Drawer Slides: For each size and type, quantity equal to 2 percent of total installed, but not less than 2 pairs; includes fasteners.
 - 7. Locks: For each type, quantity equal to 2 percent of total installed, but not less than 2; includes fasteners.
 - 8. Grommets: Quantity equal to 2 percent of total installed, but not less than 5.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than 5 years of documented experience and approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation.
- B. Environmental Requirements: Do not deliver casework until the following conditions have been met:
 - 1. Building has been enclosed (windows and doors sealed and weather-tight).
 - 2. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place and will remain operating.
 - 3. Painting and other "wet work" construction is complete in the casework areas.
- C. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.
- D. Storage:
 - 1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the above environmental requirements.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion. Defects include, but are not limited to:
 - 1. Delamination of components.
 - 2. Failure of adhesives.
 - 3. Failure of hardware.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Catalog numbers indicated on Drawings are for products manufactured by TMI Systems Design Corporation: www.tmisystems.com.
 - 1. Provide either the indicated "Basis of Design" products or equivalent products from one of the following:
 - a. Advanced Cabinet Systems: www.advancedcabinetsystems.com.
 - b. Case Systems: www.casesystems.com.
 - c. Stevens Industries, Inc.: www.stevensind.com.
 - d. Strata Design; www.stratadesign.com.
 - e. Wood-Metal Industries; www.wood-metal.com.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Obtain casework from single source and manufacturer, unless otherwise indicated.

2.02 PERFORMANCE REQUIREMENTS

- A. Accessibility: Comply with ICC A117.1 and ADA Standards.

2.03 MATERIALS

- A. Casework Adhesives: As recommended by casework manufacturer.
- B. Laminate Adhesive: Type recommended by casework manufacturer to suit application.
- C. Wood-based Materials - General:
 - 1. Maximum Moisture Content: 7 percent.
- D. Hardwood Plywood: HPVA HP-1, particleboard core.
- E. Particleboard: ANSI A208.1, Grade M-2.
 - 1. Moisture resistant where indicated.
- F. Medium Density Fiberboard (MDF): ANSI A208.2, Grade 130.
 - 1. Moisture resistant where indicated.
- G. Laminates:
 - 1. High-Pressure Decorative Laminate (HPDL); NEMA LD 3; Grades as indicated.
 - 2. Thermally Fused Laminate (TFL) : Melamine resin; NEMA LD 3, Grade VGL.

- H. Edgebanding: Rigid PVC extrusions, flat shaped, smooth texture, through color with satin finish. Width to match component thickness.
 - 1. 0.118 inch (3 mm) thick at doors, drawer fronts, and countertops.
 - 2. 0.039 inch (1 mm) thick elsewhere, including exposed exterior cabinet members, top edges of drawer boxes, adjustable shelves, and interior panels.
- I. Tempered Glass: Annealed float glass ASTM C1036, Type 1 (Transparent Flat), Class 1 (Clear), Quality Q3; fully tempered per ASTM C1048, Kind FT. Complying with ANSI Z97.1.
 - 1. Glass Thickness: 1/4 inch, minimum.
 - 2. Exposed Edges: Ground smooth.

2.04 **HARDWARE AND ACCESSORIES**

- A. Hardware and Accessories, General:
 - 1. Cabinet Hardware: Comply with BHMA A156.9, types as indicated for quality grade specified.
 - a. Finishes:
 - 1) Exposed Hardware: Provide finish that complies with BHMA A156.18 for BHMA finish number indicated. Unless otherwise indicated, provide the following finishes:
 - (a) Satin Stainless Steel: BHMA 630.
 - (b) Satin Chromium Plated: BHMA 626.
 - 2) Concealed Hardware: Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
 - 2. Provide all fasteners, hardware and accessories for a complete installation including:
 - a. Undercounter plastic laminate support panels or metal support brackets.
 - b. Free-standing table hardware.
 - B. Hinges: Semiconcealed type, Grade 1, 3 knuckle, semi-concealed, institutional hinges, with 3 way adjustment, 270 degree opening, steel with satin finish.
 - 1. Provide two hinges for doors less than 36 inches high, and provide three hinges for doors more than 36 inches high.
 - 2. Provide four hinges for tall cabinet doors.
 - C. Door Catches: Heavy-duty magnetic or roller type catch and strike plate.
 - 1. Doors up to 48 inches high shall have single catch mounted at bottom door edge.
 - 2. Doors over 48 inches high shall have catch at both the top and bottom edges of door.
 - D. Pulls:
 - 1. Type: Back-mounted wire pulls, standard U-shape style.
 - a. Material: Solid aluminum, stainless steel, or chrome-plated brass.
 - b. Overall Size: 4-1/2 inches wide by 1 inch deep.
 - 2. Provide as follows:
 - a. Doors: Single pull.
 - b. Drawers up to 24 inches Wide: Single pull.
 - c. Drawers over 24 inches Wide: Two pulls.
 - E. Drawer Slides: Epoxy coated with nylon rollers or zinc plated with steel ball-bearings; self-closing with positive stop both directions. Load rating at full extension as follows:
 - 1. Drawers less than 2 inches deep: 50 lbs.
 - 2. All Drawers 2 to 4 inches deep: 100 lbs.
 - 3. File Drawer and Drawers over 4 inches deep: 150 lbs.
 - F. Adjustable Shelf Supports: Double-pin clear polycarbonate shelf rests with shelf anti-tipping feature complying with BHMA A156.9, Type B04013. Designed to mount into pre-drilled holes in casework sides. Each shelf rest shall support 200 lbs, minimum.
 - G. Locks: Removable core, disc tumbler, cam style lock with strike for drawers and doors. At other locations, use lock style to suit application.

1. Door Locks: BHMA A156.11, E07121.
2. Drawer Locks: BHMA A156.11, E07041.
3. Provide locks at all cabinets and drawers unless otherwise noted or indicated.
 - a. Coordinate lock locations with the Architect.
 - b. All locks within a room shall be keyed alike and different than adjacent rooms. All locks on the Project shall be master keyed.
 - 1) Provide 2 keys for each room and three 3 master keys.
- H. Sliding Door Track: Manufacturer's standard anodized aluminum double channel assembly with track/door rollers; type and size to suit sliding-doors.
- I. Grommets: 2 inch outside diameter, molded-plastic grommets and matching plastic caps with wire passage slot.
 1. Color: Black.
- J. Coat Rods:
 1. Rod: Minimum 1 inch diameter steel tube; minimum wall thickness 0.075 inch (14 gage).
 2. Brackets: Steel mounting brackets.
- K. Casters: Non-marking, soft, rubber wheels with ball bearing assembly.
 1. Brakes: Provide 2 brakes, minimum, per mobile unit.
 2. Load Capacity: 200 pounds, minimum, per caster.

2.05 MANUFACTURED PLASTIC LAMINATE CASEWORK

- A. Cabinet Construction - General:
 1. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
 - a. Laminate-clad panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels.
 - b. Provide cabinet sizes and configurations as indicated on Drawings.
 2. Quality Standard: AWI/AWMAC/WI (AWS), unless noted otherwise.
 - a. Grade: Premium.
 3. Design Style: Flush overlay, frameless construction.
- B. Core Material: Particleboard or MDF, unless otherwise indicated.
- C. Component Thicknesses: Not less than the following.
 1. General component thicknesses unless otherwise indicated:
 - a. Base Cabinets: 3/4 inch.
 - b. Wall Cabinets: 3/4 inch.
 - c. Tall Cabinets: 3/4 inch.
 2. Cabinet Backs:
 - a. 1/4 inch thick.
 3. Shelves:
 - a. 36 inches or less in length: 3/4 inch thick, unless otherwise indicated.
 - b. Over 36 inches in length: 1 inch thick.
 4. Doors:
 - a. Height 48 inches or less: 3/4 inch thick.
 - b. Height over 48 inches: 1 inch thick
 5. Drawer Subfronts, Sides and Backs: 1/2 inch thick.
 6. Drawer Bottoms:
 - a. 24 inches or less in width: 1/4 inch thick.
 - b. Over 24 inches in width: 1/2 inch thick.
- D. Exposed Materials:
 1. Laminates: High-Pressure Decorative Laminate (HPDL), Grade VGS.
 2. Edgebanding: Provide specified edgebanding unless noted otherwise.
- E. Semi-Exposed Materials:

1. Laminates: Thermally Fused Laminate (TFL).
2. Edgebanding: Provide specified edgebanding unless noted otherwise.
- F. Concealed Materials:
 1. Laminates: High-Pressure Decorative Laminate (HPDL), Grade BKM, BKV, BKL, or CLS as appropriate for conditions.
- G. Joints doweled, glued and screwed.
- H. Drawer Materials and Construction: Hardwood veneer plywood. Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 1. Drawer Construction Method: Multiple dovetailed or doweled; with captured bottoms.
- I. All cabinets shall be manufactured with balance construction; apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- J. Laminates: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
- K. Edgebanding: Do not use more than one piece for any single length.
- L. Glazing for Doors: Clear tempered glass.
- M. Aprons and Modesty Panels: Provide panels matching construction and finish of casework.
- N. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
- O. Hardware Application: Factory-machine casework members for hardware that is not surface applied.
- P. Provide cutouts for electrical receptacles and other utility, mechanical, and electrical components as indicated.
- Q. Access Panels: Provide as required for maintenance of utility service and mechanical and electrical components.
- R. Mobile Cabinets: Same construction as fixed base cabinets, with modifications.
 1. Toe kick space eliminated.
 2. Cabinet underside reinforced as is standard with the manufacturer to provide caster mounting points.
 - a. Four casters, minimum.
 3. For cabinets with drawers, include a counterweight to prevent the cabinet from tipping when one drawer is opened.

2.06 COUNTERTOPS

- A. Fabricate in accordance with AWI/AWMAC/WI (AWS), Section 11 - Countertops, Premium Grade, unless otherwise noted.
- B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
 1. Laminate Sheet: NEMA LD 3, Grade HGS (0.048 inch thick).
 2. Core: Particle board or medium density fiberboard (MDF).
 - a. Core shall be moisture resistant.
 3. Edges: PVC edge banding, 0.118 inch (3mm) thick, matching laminate in color, pattern, and finish.
 - a. Square profile, substrate built up to minimum 1-1/4 inch thick.
 4. Back and End Splashes: Field applied. Same material, same construction.
 - a. Minimum Height: 4 inches.
- C. Solid Surface Countertops: Solid surfacing sheet over continuous substrate.
 1. Solid Surfacing: Complying with ISFA 2-01; acrylic or polyester resin, mineral filler, and pigments; homogenous and non-porous; color and pattern consistent throughout thickness.
 2. Flat Sheet Thickness: 1/2 inch, minimum.

3. Substrate: Particle board, medium density fiberboard (MDF), or plywood.
 - a. Thickness: 3/4 inch.
 - b. Moisture resistant.
 4. Sinks and Bowls: Integral castings; minimum 3/4 inch wall thickness; comply with IAPMO Z124.
 5. Other Components Thickness: 1/2 inch, minimum.
 6. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.
 7. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
 - a. Field applied.
 8. Fabricate in accordance with manufacturer's standard requirements.
 9. Manufacturers:
 - a. DuPont; Corian: www.corian.com.
 - b. Substitutions: Not permitted.
- D. Solid Surface Countertops - Natural Quartz and Resin Composite: Solid surfacing sheet of natural quartz and plastic resin over continuous substrate.
1. Solid Surfacing: Complying with ISFA 3-01; orthophthalic polyester resin, mineral filler, and pigments; homogenous and non-porous; no surface coating; color and pattern consistent throughout thickness
 2. Flat Sheet Thickness: 3/4 inch, minimum.
 3. Substrate: Particle board, medium density fiberboard (MDF), or plywood.
 - a. Thickness: 3/4 inch.
 - b. Moisture resistant.
 4. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with the MIA (DSDM).
 5. Other Components Thickness: 3/4 inch, minimum.
 6. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.
 7. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
 - a. Field Applied.
 8. Fabricate in accordance with manufacturer's standard requirements.
 9. Manufacturers:
 - a. DuPont; Corian Quartz: www.corian.com.
 - b. Substitutions: Not permitted.
- E. Fabrication:
1. Plastic Laminate:
 - a. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1) Join lengths of tops using best method recommended by manufacturer.
 - 2) Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 - 3) Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
 - b. Provide field-installed back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 2. Solid Surfacing:
 - a. Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
 - 1) Integral sinks: Shop-mount securely to countertop with adhesives, using flush configuration, as per manufacturer's instructions, and as detailed on drawings.
 - 2) Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.

- 3) Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- b. Provide field-installed back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.

2.07 ACCESSORIES

- A. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- B. Countertop Adhesives: As recommended by solid surfacing manufacturer.

2.08 COLORS AND FINISHES

- A. Laminate Colors, Patterns, and Finishes:
 1. High-Pressure Decorative Laminates:
 - a. PL1 Formica, Mouse 928-58.
 - b. PL2 Formica, Winter Sky 8792-58
 - c. PL3 Formica, Fossil 5349-58
 2. Thermally Fused Laminates:
 - a. Color: White.
- B. PVC Edgebanding Colors:
 1. Color(s): Architect shall select four (4) colors from Manufacturer's full line..
- C. Solid Surfacing Colors, Patterns, and Finishes:
 1. Colors:
 - a. SS1 Corian, Rain Cloud.

PART 3 EXECUTION

3.01 PREPARATION

- A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

3.02 EXAMINATION

- A. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch leveling adjustment.
- B. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
 1. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 ft and 1/2 inch in 20 ft or more, and/or maximum variation from plumb exceeds 1/4 inch per story.
 2. Maximum Variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet in any direction.
- C. Verify adequacy of support framing and anchors.
- D. Verify that service connections are correctly located and of proper characteristics.

3.03 CASEWORK INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- C. Set casework items plumb and square, securely anchored to building structure.
- D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.

- E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch. In addition, do not exceed the following tolerances:
 - 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
 - 2. Variation of Bottoms of Wall Cabinets from Level: 1/8 inch in 10 feet.
 - 3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
 - 4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.
 - 5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.
 - F. Secure wall and floor cabinets to concealed reinforcement at gypsum board assemblies.
 - G. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 - 1. Where base cabinets are installed away from walls or service space framing, anchor to floor at toe space at not more than 24 inches on center, and at sides of cabinets with not less than two fasteners per side.
 - H. Wall Cabinets: Fasten to hanging strips, and/or wall substrates. Fasten each cabinet through back, near top, at not less than 16 inches on center.
 - I. Install hardware uniformly and precisely.
 - J. Replace units that are damaged, including those that have damaged finishes.
- 3.04 **COUNTERTOP INSTALLATION**
- A. Install in accordance with manufacturer's instructions.
 - B. Install countertops in one true plane, with ends abutting at hairline joints, and no raised edges.
 - 1. Variation From Level/Horizontal: 1/8 inch in 10 feet, maximum.
 - 2. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
 - 3. Field Joints: 1/16 inch wide, maximum.
 - 4. Do not exceed 1/64 inch difference between planes of adjacent units.
 - C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
 - D. Attach solid surfacing countertops to subtops using compatible adhesive.
 - 1. Secure back/end splashes to countertop and vertical substrates with waterproof adhesive.
 - E. Attach stainless steel countertops using concealed stainless steel fasteners and clips.
- 3.05 **ADJUSTING**
- A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.
- 3.06 **CLEANING**
- A. Clean casework and other installed surfaces thoroughly.
- 3.07 **PROTECTION**
- A. Do not permit finished casework to be exposed to continued construction activity.
 - B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.
 - C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

MANUFACTURED PLASTIC LAMINATE-CLAD
CASEWORK
12 3216-10

SECTION 12 3600 - COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sinks molded into countertops.
- B. Epoxy resin sinks.

1.02 REFERENCE STANDARDS

- A. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2018.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).
- C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1 2017, with Errata (2019).

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- G. Installation Instructions: Manufacturer's installation instructions and recommendations.
- H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

1.05 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.

1.06 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 absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS

- A. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
 - 1. Manufacturers:
 - a. Durcon, Inc, ClassicTop Epoxy Resin: www.durcon.com/#sle.
 - 2. Flat Surface Thickness: 1 inch, nominal.
 - 3. Flammability: Self-extinguishing, when tested in accordance with ASTM D635.

4. Surface Finish: Smooth, non-glare.
5. Color: Black.
6. Exposed Edge Shape in Sink Areas: Built-up marine edge 1/4 inch higher than counter by 1 inch wide.
7. Drip Edge: Drip groove 1/8 inch wide and deep, located 1/2 inch back from edge on underside of all exposed edges.
8. Back and End Splashes: Same material, same thickness; separate for field attachment.
9. Sinks: Same material, same color; integrally molded with counter; bottom sloped to outlet; molded outlets; drain outlet located in back corner.
 - a. Sides and Ends: 1/2 inch minimum thickness.
 - b. Bottoms: 5/8 inch minimum thickness.
 - c. Interior Corners: 1 inch minimum radius.
 - d. Clamping collars for 1-1/2 or 2 inch diameter waste pipe, for sealed but not permanent connection.
 - e. Steel channel supports front to back on each side, fastened to underside of top to support twice full sink weight.
10. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.
11. Fabricate in accordance with manufacturer's standard requirements.

2.02 MATERIALS

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

2.03 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 1. Join lengths of tops using best method recommended by manufacturer.
 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 2. Height: 4 inches, unless otherwise indicated.

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.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

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. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach epoxy resin countertops using compatible adhesive.
- C. Seal joint between back/end splashes and vertical surfaces.

3.04 CLEANING

- A. Clean countertops surfaces thoroughly.

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

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

SECTION 13 1100 - SWIMMING POOL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The BIDDING REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT and applicable parts of DIVISION 1 - GENERAL REQUIREMENTS, as listed in the Table of Contents, shall be included in and made a part of this Section.

1.02 SUMMARY OF WORK *(for general guidance, not all inclusive)*

- A. Introduction
 - 1. Provide all labor, materials, equipment and services necessary to renovate the existing lap pool. This work shall include the structure and installation of pool finishes as well as all products listed in Part 2 of Section 13 1100.
- B. Work included in this section
 - 1. It is the intent of this section to place the entire responsibility for the construction of the pool (including the construction of the pool shell) under one vested CONTRACTOR. Under this section the Swimming Pool Contractor will provide but is not necessarily limited to the following:
 - a. Provide all equipment and services required for erection and delivery onto the premises of any equipment or apparatus provided. Remove equipment from premises when no longer required.
 - b. Grade and replace load bearing or high plasticity index soil, pump and dewater as necessary to keep excavations free from water during construction. Reference Division 31 - Earthwork.
 - c. Provide and maintain proper shoring and bracing for existing utilities, sewers and building foundations where required for related excavations. Reference Division 31 - Earthwork.
 - d. Provide all electrical conduit, wiring, junction boxes etc. to all low voltage pool equipment within pool filter/chemical rooms per Division 26 - Electrical. (Low voltage is considered less than 110 V.)
 - e. Coordinate for all required bonding and grounding of the pool shell, fittings, and equipment.
 - f. Provide all necessary piping and valving as shown on the drawings and specified herein.
 - g. Provide individually sized housekeeping pads for the recirculation pump strainer.
 - h. Construct the cast in place concrete pool shell as described in these specifications and detailed on the drawings, including reinforcement steel, inserts, fittings, and all embedded items (piping, anchors, etc.) for the renovated pool. Reference Division 3 - Concrete and Structural. Before commencing the placement of concrete, verify electrical bonding of the pool embedded items and reinforcing steel. Also, coordinate and arrange any required electrical, plumbing and or building inspections.

- i. Provide a ceramic tile finish in the pool with a slip resistant surface with a vertical tile band. Provide specialty tile for the perimeter tile deck band, depth markings and warning signs, construction joint installation bands and all other tile installation within the pool structures. Reference Section 13 1103 - Swimming Pool Tile - including the tolerance requirements for the concrete substrate.
 - j. Assemble and install the cleaning and maintenance equipment for the pool as specified herein.
 - k. Layout and install all deck mounted anchors, sockets, and inserts for the pool.
 - l. Provide for the storage of all pool related equipment, materials and systems. All items are the responsibility of the CONTRACTOR until accepted by owner.
 - m. Obtain final acceptance by jurisdictional health department(s).
 - n. Start, test, calibrate and adjust all mechanical equipment, electrical equipment, recirculation, chemical, and other supplied systems. Instruct the Owner's representative in the systems operation and maintenance as described herein.
- C. Related work specified in other sections
- 1. Section 02 4119 - Selective Demolition
 - 2. Section 13 1103 - Swimming Pool Tile
 - 3. The following work related to the swimming pools shall be completed by other trades.
 - a. Provide, erect and maintain all necessary barricades, signs, lights and flares for pool construction to protect workers and the public.
 - b. Layout, excavate, remove from the construction site, replace and grade materials as required beyond the limits of excavation of the pool shell to complete the work described in this section. Reference Division 31 - Earthwork.
 - c. Prior to concrete pours, verify electrical bonding of the pool embedded items. Coordinate and arrange any required electrical, plumbing and or building inspections to be performed on embedded items. Reference Division 26 - Electrical.
 - d. Provide sanitary sewer drain connections. Reference Division 22 - Plumbing.
 - e. Provide deck finish beyond perimeter tile band. Reference Division 32 - Exterior Improvements.
 - f. Provide rules and regulations signage as required by code. Reference Division 1 - General Requirements.
 - g. Provide chlorine resistant caulking (sealant) and backer rod on pool decks. Reference Division 7 - Thermal and Moisture Protection.
- D. Related work specified in Plumbing section. Reference Division 22 - Plumbing. Work to be completed by other contractors.
- 1. Provide trench drains and area drains on pool deck.

2. Provide water service to all hose bibbs, flush hydrant boxes and auto-fill bypass to the pool system. Install the slow closing solenoid valve in the bypass auto-fill piping.
 3. Install Plumbing Contractor supplied water meter on the fresh water supply line upstream of the manual fill valve and the slow closing solenoid valve.
- E. Related work specified in Mechanical section. Reference Division 23 – Mechanical/HVAC. Work to be completed by other contractors.
1. Provide air recirculation systems for pool related spaces.
 2. Provide any related systems for supplemental pool water heating.
- F. Related work specified in Electrical sections. Reference Division 26 – Electrical. Work to be completed by other contractors.
1. Provide power to the exhaust fans for the chemical rooms.
 2. Ground and bond all pool structures, fittings and equipment in accordance with Article 680 of the N.E.C. Test and verify that the system electrical ground is true and solid. Provide certification to this effort.
 3. Obtain permits, inspections, and approvals of all wiring including grounding and bonding of all metal components associated with the pool in accordance with Local, State and National Electrical Codes.
 4. Confirm all electrical conduits that penetrate the pool shell are watertight and installed per N.E.C. Article 680.

1.03 QUALITY ASSURANCE

- A. The specifications and drawings illustrate and detail one (1) renovated swimming pool system that shall be utilized for both instructional and recreational use. Certain technical aspects of the design are common only to pool systems planned for public use. Understanding these aspects, their functions and interaction through experience is vital to completing a successful operating system. It is a mandatory requirement that all bidders will have achieved such experience as a prerequisite for bidding this project.
1. Contractor to refer to section 00 2113 – Instruction to Bidders for bonding requirements.
 2. If the Contractor has not received prior written approval for this project or has not been included in the pre-approved list of Contractors, they must submit a list of projects meeting the aforementioned qualifications, including contact information of the General Contractor shall be submitted for review and approval at least 10 days prior to bidding of the project. The Contractor must have completed at least eight (8) public-use pools with individual water surface areas in excess of 4500 square feet within the past 10 years.
 3. The Contractor must submit prior to the start of construction the name of the on-site Project Superintendent including their relevant experience. The Contractor's on-site Project Superintendent must have completed at least five (5) public-use pools with individual water surface areas in excess of 4500 square feet within the past 10 years. A list of projects meeting the aforementioned qualifications, including contact information of the General Contractor as well as Owner shall be included with the experience submittal. Project Superintendent must not change on the project unless written authorization has been provided by the Architect and Owner.

4. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligation of the contract and to complete the work described or if the bidder does not have the qualifications stated herein. Subject to compliance with item 2 above on this specification.
5. The following bidders have been pre-approved. All bidders shall meet the requirements listed above.

Acapulco Pools
Bernie Gall
1550 Victoria St. N.
Kitchener, Ontario N2B3EZ
Phone: 519 - 743-6357
Fax: 519-743-9698

Baruzzini
Tony Baruzzini
1281 S. Old US Hwy 23
Brighton, MI 48114
p: 810.229.8996
f: 810.229.1874

B & B Pools
Timothy Sedmak
31071 Industrial
Livonia, MI 48150
p: 734.427.3242
f: 734.427.3235

High Tech Pools
Jeff Hammerschmidt, Frank Duale
31333 Industrial Pkwy
North Olmstead, OH 44070
p: 440.979.5070
f: 440.979.5076

Aquatic Source
Nick Shelton
190 Summit St
Brighton, Michigan 48116
p: 248.366.0606

Spear
Sam Blake
7 South Walnut St
Roachdale, IN 46172
p: 765.522.1126

1.04 REGULATORY AGENCY REQUIREMENTS AND ENGINEERING SERVICES

- A. The system shall comply with all necessary pre-construction approvals obtained by the Owner and Owner's Consultants from local regulatory agencies governing the design and construction of public swimming pools.
- B. The Contractor shall give all necessary notices, obtain all permits and pay all government fees, and other costs in connection with his work, including the filing of all necessary as-built drawings, prepare all documents and obtain all necessary approvals of governmental departments having jurisdiction over their work. The Contractor shall also be responsible for obtaining all required certificates of inspection for his work and deliver same to the Owner and Owner's Consultants before requesting acceptance and final payment for the work.
- C. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus or drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on drawings and/or specified.

1.05 COORDINATION AND CLARIFICATION

- A. Coordinate with other contractors or subcontractors all work relating to this section.
- B. The Contractor must establish with other contractors or subcontractors, having related work in this section, that all work necessary to complete the pool as shown on the drawings and in the specifications is included in the base bid and alternates to the Owner.
- C. If in doubt regarding the responsibility for work covered in this section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Architect through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.06 ALTERNATES

- A. Review the description of the alternates in Division 1 and on the drawings for possible effect upon work in this section. Alternates related to the work in this section are described in this division and on the bid proposal form.
- B. Pool Alternates
 - 1. Alternate #6: Contractor shall furnish and install a medium pressure ultraviolet dechloramination and disinfection system to handle 100% of the recirculation flow per drawings and specifications.
- C. Unit Pricing: As part of the base bid, the Contractor shall perform a sound testing of the existing interior pool tile finish and carry 500 SF for replacement at areas not adhering, around existing embeds that require replacement, or where there is discoloration or rust bleed-through. Contractor shall submit unit pricing per additional 100 SF that is deemed necessary for replacement following the sound testing.

1.07 CONTRACTOR'S ALTERNATE PROPOSAL

- A. Contractor shall submit his bid to the owner based on materials, equipment and methods as specified in this Section. No substitutions of material will be allowed.
- B. It is the intent of the contract documents to encourage competition. The base proposal must be on providing the construction methods and equipment as specified and detailed. Any proposed system substitution must have prior written approval by the Architect.
- C. If there is any deviation from the basis of design equipment it is the responsibility of the contractor to confirm that all engineering criteria are appropriate for the substituted equipment.
- D. All proposed substitutions of specified construction methods and equipment shall include a complete submittal as required by these specifications and drawings of appropriate scale incorporating all required changes. The Contractor shall provide a list of at least ten (10) satisfactory installations comparable to this project that have been manufactured and installed under the manufacturer's current legal name. Submit a list of such projects with the name, address and current telephone number of the Owner's Operator and Architect of Record to the Architect on the bid date.
- E. Any changes or modifications to the Contract Documents that are not authorized by the architect shall be the sole responsibility of the Contractor.

1.08 SUBMITTALS

- A. All submittals shall be made in accordance with the requirements of Division 1 - General Requirements and in strict compliance with the following procedures and guidelines.
- B. One (1) set of shop drawings and engineering data shall be tabbed, indexed, and referenced to the specifications, compiled into an electronic submittal, and submitted in two stages. The first stage shall include all items for the pool shell, reference swimming pool structural specifications. The second stage shall be for all remaining items. Each section of items shall be prefaced by a cover sheet listing the items submitted within the section. All electronic submittals shall be organized, numbered, and submitted in the same format and order as the project specifications. Only complete sets will be reviewed.

1. Engineering data covering all systems, equipment, structures and fabricated materials, which will become a permanent part of the work under this contract, shall be submitted for review. This data shall include drawings and descriptive information in sufficient detail and scale to show the kind, size, arrangement, and operation of component materials and devices; the external connections, anchorage and supports required; performance characteristics; fabrication and dimensions needed for installation and correlation with other materials and equipment. A certification, in writing, shall be provided indicating that all equipment will fit in the space allotted and as shown on the drawings.
2. All submittals regardless of origin shall be stamped with the approval of the CONTRACTOR and identified with the name and number of this contract, CONTRACTOR'S name, and references to applicable specification paragraphs and contract drawings. Each submittal shall indicate the intended use of the item in the work. When catalog pages are submitted, applicable items shall be clearly identified. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.
3. The submittals will not be accepted from anyone but the CONTRACTOR. Submittals shall be consecutively numbered in direct sequence of submittal and without division by subcontracts or trades.
4. The CONTRACTOR'S stamp of approval is a representation that the CONTRACTOR accepts full responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers and similar data, and that he has reviewed or coordinated each submittal with the requirements of the work and the contract documents.
5. Each submittal shall include a statement prepared by the originator of the drawings and data, certifying compliance with the contract documents except for deviations, which are specifically identified.
6. All deviations from the contract documents shall be identified on each submittal and shall be tabulated in the CONTRACTOR'S letter of transmittal. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by the CONTRACTOR (including modifications to other facilities that may be a result of the deviation) and all required piping and wiring diagrams.
7. The CONTRACTOR shall accept full responsibility for the completeness of each submission, and, in the case of a resubmission, shall verify that all exceptions previously noted have been taken into account. In the event that more than one resubmission is required because of failure of CONTRACTOR to respond to exceptions and rejections previously noted, CONTRACTOR shall make all further resubmissions in person at the consultant's office.
8. Any need for more than one resubmission, or any other delay in obtaining review of submittals, will not entitle the CONTRACTOR to an extension of the contract time unless delay of the work is directly caused by a change in the work authorized by a change order.
9. Review of drawings and data submitted by CONTRACTOR will cover only general conformity to the drawings and specifications, external connections and dimensions that affect the layout. Review does not indicate a thorough review of all dimensions, quantities, and details of the material, equipment, device or item shown. Review of submittals shall not relieve CONTRACTOR from responsibility for errors, omissions, or deviations, or responsibility for compliance with the contract documents.

10. When the drawings and data are returned marked REJECTED, REVISE AND RESUBMIT or SUBMIT SPECIFIED ITEM, the corrections shall be made as noted thereon and as instructed and six corrected copies (or one copy and one corrected reproducible copy) resubmitted.
11. Resubmittals shall bear the number of the first submittal followed by a letter (A, B, etc.) to indicate the sequence of the resubmittal. All resubmittals shall be indexed, tabbed, referenced to the specifications and bound in a three-ring binder and submitted at one time.
12. When corrected copies are resubmitted, the CONTRACTOR shall, in writing, direct specific attention to all revisions and shall list separately any revisions made other than those called for on previous submissions.
13. When the drawings and data are returned marked NO EXCEPTIONS TAKEN or MAKE CORRECTIONS NOTED, no additional copies need to be furnished unless specifically requested to do so for record.

C. Permits, Receipts and Test Reports

1. Provide the Architect with copies of all permits and receipts for fee payments.
2. Submit a sample format for each test report intended for use. Submit test reports required herein only on approved forms.

D. Include complete product data indexed, tabbed, and referenced to specifications with 8 ½" x 11" cover sheet covering:

1. Paragraph 2.01 - Overflow System
2. Paragraph 2.02 - Pumping Equipment
3. Paragraph 2.03 - Filtration Equipment
4. Paragraph 2.04 - Recirculation Fittings
5. Paragraph 2.05 - Piping Systems
6. Paragraph 2.06 - Chemical Treatment Systems
7. Paragraph 2.07 - Water Chemistry Monitoring & Control System
8. Paragraph 2.08 - Flow Meter
9. Paragraph 2.09 - Water Level Controller
10. Paragraph 2.10 - Inserts and Anchor Sockets
11. Paragraph 2.11 - Deck Equipment
12. Paragraph 2.12 - Swimming Pool Finishes
13. Paragraph 2.13 - Waterproofing
14. Paragraph 2.14 - Sealants

E. Include engineering/construction drawings for the pool structure.

1. Reference Division 3 - Concrete.
- F. Include engineering construction drawings for all pool piping.
- G. Reference Section 02 4119 - Selective Demolition
- H. Reference Section 13 1103 - Swimming Pool Tile

1.09 OPERATION AND MAINTENANCE MANUALS AND CLOSE-OUT SUBMITTALS

- A. Detailed operation and maintenance information shall be supplied for all equipment requiring maintenance or other attention. The equipment supplier and/or CONTRACTOR shall prepare an operation and maintenance manual for all equipment. Parts lists and operating and maintenance instructions shall be provided.
- B. Each operation and maintenance manual shall include the following:
 1. Equipment function and calibration, normal operating characteristics, and limiting conditions.
 2. Assembly, installation, alignment, adjustment and checking instructions.
 3. Operating instructions for start up, routine and normal operation, regulation and control, shut down and emergency conditions.
 4. One (1) copy of all instructional videos.
 5. Operating cycles shall be specifically described in outline format and in referenced detail. A wall-mounted color-coded piping flow diagram shall be provided in the pool equipment room. The diagram shall be engraved on laminated plastic with color-coded piping to match color of coding on piping, and including valves identified with number on tags. The minimum size shall be 11 inch x 17 inch.
 6. Include manufacturer recommended maintenance schedule, parts lists, piping diagram (to agree with wall mounted diagram) and trouble-shooting information for all pool mechanical equipment.
 7. Using reference to keyed valves and wall diagram, include specific written instructions for procedures to be followed for the following:
 - a. Emptying and refilling the pool including de-watering during the period that the pool will be empty;
 - b. Water level control adjustment and chemical control operation;
 - c. Filter operation and backwashing; and
 - d. Super chlorination.
 8. Lubrication and maintenance instructions.
 9. Guide to "trouble-shooting".
 10. Parts list and predicted life of parts subject to wear.
 11. Outline, cross section, and assembly drawings; engineering data and wiring diagrams.

12. Test data and performance curves, where applicable.
13. Specific written instructions for procedure for emptying and refilling the pool including de-watering during any period that the pool will be empty. Include furnishing and installing a yellow warning sign 8-1/2 in. x 11 in., to be mounted in the filter room, that reads:

WARNING
Prior to emptying Pool
Consult O & M Manuals for Procedures

Add another sign shall read:

Keep all Caps, Plugs and Tops Tight Fitting to Prevent Escape of Fumes.

14. One set of applicable submittals shall be included in each manual.
- C. The operation and maintenance manuals shall be in addition to any instructions or parts lists packed with or attached to the equipment when delivered, or which may be required by the CONTRACTOR.
- D. Manuals and other data shall be printed on heavy, first quality paper, 8-1/2 x 11 inch size with standard 3-hole punching and inserted in plastic covers. Drawings and diagrams shall be reduced to 8-1/2 x 11 inches or 11 x 17 inches. Where reduction is not practical, larger drawings shall be folded separately and placed in envelopes that are bound into the manuals. Each envelope shall bear suitable identification on the outside.
- E. Six (6) bound volumes of each manual shall be submitted. All parts lists and information shall be assembled in substantial manuals and permanent, three-ring or three-post binders. Material shall be assembled and bound in the same order as specified, and each volume shall have a table of contents and suitable index tabs.
- F. All material shall be marked with project identification. Non-applicable information shall be marked out or deleted.
- G. Shipment of equipment will not be considered complete until all required manuals and data have been received.

1.10 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver material in manufacturer's original, unopened containers and crates with all labels intact and legible.
- B. Deliver materials in sufficient time and quantity to allow continuity of work and compliance with approved construction schedule.
- C. Handle materials in a manner to prevent damage.
- D. Store all materials on clean raised platforms with weather protective coverings. Provide continuous protection of materials against damage or deterioration.
- E. Remove damaged materials from site.

1.11 WARRANTIES

- A. The CONTRACTOR warrants to the Owner and Architect that materials and equipment provided under the contract will be of good quality and new unless otherwise required or permitted by the contract documents, that the work will be free from defects not inherent in the quality required or permitted, and that the work will conform with the requirements of the contract documents. Work not conforming to these requirements, including substitutions not properly approved and authorized will be considered defective. The CONTRACTOR'S warranty will exclude remedies for damage or defect caused by abuse, improper or insufficient maintenance, improper operations, modifications not executed by the CONTRACTOR or improper wear and tear under normal use. If required by the Architect, the CONTRACTOR shall furnish satisfactory evidence as to the kind and quality of materials and equipment. All warranties shall be for a period of one year from the date of substantial completion or the owner begins using the pool unless otherwise specified.
- B. The CONTRACTOR shall agree to repair or replace any defective or non-complying work at no cost to the Owner upon written notification from the Owner within the warranty period. Pro-rated warranties are not acceptable.
- C. Submit all warranties covering, but not limited to the following:
1. All pool deck equipment and accessories against defects in material, manufacturer and installation for a period of one (1) year.
 2. Defects in material, manufacture or installation of the recirculating overflow system and interior coating of the trench for a period of one (1) year.
 3. Defects in material, manufacture and installation of the chlorination, pH adjustments and cleaning systems, including controls for a period of one (1) year.
 4. Defects in material or workmanship of the pool structure causing a loss of water for a period of three (3) years.
 5. Defects in material, workmanship, and installation of the pool piping system for a period of three (3) years.
 6. Manufacturer's minimum five (5) year warranty against defective materials, components and workmanship in the pool chemical controller. ORP, pH, flow and temperature sensors shall be covered by a standard two (2) year warranty. All other sensors and flow cell components shall be covered by a standard one (1) year warranty.
 7. Defects in material, workmanship, and installation of the tile finish against cracking and delamination for a period of five (5) years.

8. Manufacturer's minimum fifteen (15) year warranty on the filter tank and lining against defective materials or workmanship of the tank and components. (Additional warranty time may be purchased from the manufacturer.) Prorated warranties are not acceptable. Flexsol 3000 lined vessels shall carry a fifteen (15) year limited non-prorated warranty. The filter manufacturer shall bear the responsibility for suitability of lining and shall be the sole source for the specified warranty. Internal tube elements shall carry a fully rated 10 year warranty. Valve bodies and the RMF controller shall carry a 5 year fully rated warranty. Valve operators and system accessories including the bump tire, quick exhaust valve and solenoid valve shall carry one year warranty as provided by the product manufacturer. Unless otherwise specified, workmanship is to be guaranteed first class and carry a one (1) year warranty.
9. Manufacturer's minimum one (1) year warranty against defective materials, components and workmanship in the sanitizing feed system.
10. Manufacturer's minimum one (1) year warranty against defective materials, components and workmanship in the pH buffer feed system.
11. Manufacturer's minimum fifteen (15) year systems warranty against defective materials, components and workmanship in the pool tile setting materials.
12. Manufacturer's minimum one (1) year warranty against defective materials, components and workmanship in the ultraviolet sanitizing system (excluding the UV arc tube). UV arc tubes are warranted to operate for 4000 hours when operated continuously. A continuously operated UV arc tube that fails prior to 4000 hours of operation shall be replaced free of charge. Intermittently operated UV arc tubes (>1 on/off cycle per day) will be replaced free of charge if failure occur prior to 2000 hours and prorated between 2000 and 4000 hours.

1.12 SYSTEM TRAINING

- A. A qualified representative of the CONTRACTOR performing work under this section shall put the equipment into operation and instruct the Owner's representatives in the operation of this equipment to the Owner's satisfaction immediately after project's substantial completion.
- B. The CONTRACTOR'S training representative shall have completed the equipment/system's manufacturer's training requirements and be certified, by the manufacturer, to provide and teach system training.
- C. The representative from the CONTRACTOR shall be either a CPO (Certified Pool Operator) or have an AFO (Aquatic Facility Operator) certification.
- D. Training periods shall consist of 16 hours of on-site training and scheduled as follows:
 1. 8 hours of initial training on the complete swimming pool system. The 8 hours of initial training is to be comprised of at least 4 hours of training on water chemistry analysis and adjustment. The water chemistry training will include in depth review of the use of the Langlier index and its computation.
 2. The initial 8 hours of training shall include information on the care, operation, adjustment, and maintenance of all items provided by the CONTRACTOR under the "Part 2 – Products" section of this specification.
 3. 8 hours of training after the Owner's staff has had experience operating the system. This time may be requested any time after the pool has been placed in operation within a period of one (1) year from the time the pool was accepted by the Owner. The additional training shall contain at least 2 hours of review of water chemistry.

4. The CONTRACTOR shall provide a project specific video recording instruction manual in addition to the training sessions. The video instructions shall be project specific and shall include information on the care, operation, adjustment, and maintenance of all items provided by the CONTRACTOR under the "Part 2 – Products" section of this specification. This video recording shall be done separate from the Owner training.
5. The CONTRACTOR shall include one (1) copy of all video recording instructions in each Operations and Maintenance Manual.

1.13 POOL FILL WATER QUALITY

- A. The Owner shall bear the cost of the water required for two (2) complete fillings of the pool (the initial water tightness test and the final filling). Removal of iron or copper (if in excess of .3 ppm) will be required for the final fill to avoid staining of the pool finish. Any subsequent fillings or partial fillings (more than 25%) of the pool shall be by the CONTRACTOR, at its own expense.
- B. The CONTRACTOR shall provide the necessary plant equipment so that the temperature of fill water will be within plus or minus 10 degrees of the ambient air and/or the pool structure at the time of filling. Extreme caution is urged if the temperature variance is greater than 10 degree F.
- C. The CONTRACTOR shall provide the necessary chemicals and to adjust and balance the water chemistry in the pools to the following levels:

| | |
|------------------------------|-------------------------|
| pH | 7.4 - 7.6 |
| Calcium Hardness | 200 - 400 PPM |
| Total Alkalinity | 80 - 120 PPM |
| Langelier saturation index | -0.3 - +0.3 |
| Total Dissolved Solids (TDS) | not to exceed 1,500 PPM |

1.14 START-UP CHEMICALS

- A. The CONTRACTOR shall maintain the chemical balance of the pool water (including the cost of all chemicals required) until the pool and mechanical systems are fully operational and accepted by the Architect and the Owner.
- B. Provide the Owner with sufficient quantities of the necessary chemicals to maintain the pool operation for a minimum of thirty (30) days from substantial completion or the owner begins using the pool.
- C. Chemicals to be provided to the Owner shall include those required by the chemical feed systems installed.

1.15 RECORD DRAWINGS

- A. Provide a complete set of record drawings of the entire pool system including all sub-systems. All record drawings shall be prepared in accordance with the requirements of Section 01 7839 and shall be a complete, stand-alone set. The CONTRACTOR shall be permitted to obtain original documents and copy them for this purpose only. Provide the record set on compact disk (AutoCAD Release 2010 or compatible software).

PART 2 - PRODUCTS

2.01 OVERFLOW SYSTEM

- A. It is the intent of the specifications that the perimeter overflow system and surface cleaning be maintained under all conditions of normal operation and that no water be discharged to waste except when cleaning the filters or emptying the pool.
- B. Skimmer Overflow System
 - 1. Provide skimming system consisting of units as shown on the drawings.
 - a. Basis of Design: Pool skimmers shall be Sta-Rite Model U-3 #08650-1403 white, #08650-3403 gray, #08650-2403 tan, or approved equal. Hayward Model SP1082-1 skimmer is acceptable. Equalizer suction fittings shall have a Federal Pool and Spa Safety Act (ANSI/APSP-16 2011) compliant cover manufactured by Aquastar, model #4RND101, or approved equal.
 - 2. The skimmer weirs shall be automatically adjustable and shall operate freely with continuous action to variations in water level over a range of at least 4 inches. The weirs shall operate at all flow variations. The weir shall be of such buoyancy and design so as to develop an effective velocity.
 - 3. An easily removable and cleanable basket or screen through which all overflow water must pass shall be provided to trap large solids.
 - 4. The skimmer shall be provided with a device to prevent air lock in the suction line. An equalizer pipe shall be used and shall provide an adequate amount of water for pump suction if the water of the swimming pool drop below the weir level.
 - 5. The equalizer piping and fittings shall be sized to meet the capacity requirements of the filter and pump and shall be in no case less than 2 inches in diameter. The pipe shall be located at least one (1) foot below the lowest overflow level of the skimmer. The equalizer float valve assembly shall remain tightly closed under normal operating conditions but will automatically open when the water level drops below the lowest weir operating level.
 - 6. The equalizer fitting shall be a design to reduce the possibility of hair entrapment in the fitting.
 - 7. The skimmer shall be of sturdy, corrosion-resistant materials.
 - 8. Each skimmer shall be equipped with a variable orifice trimming device to allow balancing of flow.
 - 9. Skimmers shall be NSF approved.
 - 10. Contractor shall provide a solid aluminum or fiberglass lintel plate spanning the top of each skimmer throat opening in the pool wall to support the pool coping. Lintel shall have dimensions of 7-3/4" by 2'-0" and shall be 3/8" thick. Aluminum lintel plates shall require bonding in accordance with NEC Article 680. Fiberglass lintel plates shall be of rigid design with factory finished or field sealed edges to prevent exposed jagged surfaces and moisture intrusion into the fiberglass material.

2.02 PUMPING EQUIPMENT

- A. Pump Gauges
 - 1. Pressure gauge shall be installed on the discharge of the pump.
 - 2. Compound gauge shall be provided at the intake port of the pump, after the hair and lint strainer.

3. Gauges shall be liquid filled, 316L stainless steel bourdon tube type with a minimum 2-1/2 inch diameter dial, high impact polypropylene or stainless steel case, corrosion resistant white scale with black divisions and numerals, 300 Series stainless steel heavy duty rotary bushed movement, black enameled balanced Micrometer pointer.
 - a. Basis of Design: Gauges shall be as manufactured by Weksler Instrument Corporation or approved equal.
4. Scale ranges shall be selected to indicate the normal system operating pressure of each system or location within the system. Pressure ranges shall be calibrated in psig (0-60 psi) and compound gauge shall be calibrated in inches of mercury (0-30 in Hg / 0-60 psi).
5. A stainless steel filter type pressure snubber shall be provided for each pressure gauge installed consisting of a 3/8 inch diameter by 1/8 inch thick micro metallic stainless steel filter and placed in the line just before the pressure gauge. Provide isolation brass valves or brass gauge cocks at each gauge for easy replacement and maintenance.

2.03 FILTRATION EQUIPMENT

- A. The filter system shall consist of one (1) regenerative media filter tank as shown on the drawings. Every aspect and component of the filter system must be certified by the National Sanitation Foundation (NSF) and bear the certification mark. The filter must have an engraved metal data plate permanently affixed on the face of the system that describes operational data and instructions and indicates start up date.
- B. Regenerative Media Filters with Pre-Coat in a Closed Loop
 1. Filter System
 - a. Basis of Design: The filter system under this section shall be a Neptune-Benson Defender, or approved equal, as detailed on the drawings.
 - b. It is the intent of these specifications to describe a filter system complete with all accessory items supplied and warranted by one manufacturer.
 - c. The primary components of the system consist of the main filter tank, flex tube filter elements, element assembly, bump mechanism, vacuum transfer system, sight glass, pressure gauge panel, inspection (viewing) window, valves and automatic filter controller.
 - d. All components and related subassemblies shall be factory assembled and tested prior to shipment.
 2. Filter Tanks
 - a. The filter tanks shall have a 60" side shell, suitable for 50 psi working pressure and hydrostatically tested to 75 psi. Tank shell shall be not less than 1/4" thick. Bottom dished head shall be not less than 1/4" thick. Top flat head shall be not less than 1 1/2". thick. All material to be Type A-36 carbon steel.
 - b. All welding shall be performed by qualified operators. Joints shall be butt or fillet welded inside and out by manual or automatic process. Welded joints shall have complete penetration and fusion with little or no reduction of the thickness of the base metal. Welds shall be free of coarse ripples, grooves, overlaps, abrupt ridges or valleys. All welded surfaces shall be chipped and brushed clean, when necessary, leaving no slag or splatter.

- c. Tank legs shall be constructed of 6" x 2 1/2" channel legs 1/4" thick. 24", 27" and 33' filters shall have (3) legs. 41", 49" and 55" filters shall have (4) legs. The material shall be Type A-36 carbon steel. Bearing plates shall be 10" x 5" x 1/4" type 304L stainless steel. Each bearing plate shall have (2) 5/8" drilled holes to secure to the floor with the 1/2" x 4 1/2" stainless steel concrete anchors provided. The legs shall be designed with bolted connections to minimize overall tank height for shipping and access into the mechanical room.
 - d. The tank heads shall be bolted to the shell with 7/8" diameter T304 stainless steel threaded rods and nuts, 9" on center around the tank perimeter.
 - e. Tanks shall be equipped with a UL listed grounding lug.
 - f. Tanks shall incorporate connections for filter influent, effluent, drain; 1-1/2" vacuum transfer piping, 4" viewing window, and lift shaft gland. Refer to the drawings for pipe and connection sizes.
 - g. Tanks shall include brackets for mounting of automatic controller, gauge panel, filter / regulator, vacuum transfer blower and vacuum hose rack.
 - h. The competition pool filter tank shall include an integrally mounted hydraulic lifting device (davit). The davit assembly shall be designed to lift the filter head and include a pivot mechanism allowing the head to rotate 180°, for access to the tube sheet.
3. Flexol 3000 Interior Lining
 - a. All interior surfaces shall be grit blasted to white metal condition with a 2-3 mil profile. Blasted surfaces shall be cleaned of all dust or blast residue and primed as soon as is practical on the same day blasting is done.
 - b. When priming has dried the lining process will begin. If prime coat has cured for over twenty-four hours, a refresher coat will be applied.
 - c. Flexsol 3000 shall be an elastomeric polyurethane, 100% solid plural component lining. Hardness shall be 70 durometer on the shore D scale. Break tensile strength shall be 2460 psi with elongation of 25-30%.
 - d. Application of Flexsol 3000 lining shall be done by experienced applicators using a high pressure, high temperature plural component system. All wetted surfaces including flange faces, manway rings and manway covers shall be lined to 120 mils +/- 5 mils DFT.
 - e. Hardness shall be verified after curing to ASTM D 2240 standard.
 - f. Flexsol 3000 lining shall meet the NSF toxicity standard unconditionally and shall be approved for use with the NSF approved filter.
 4. Exterior Coatings
 - a. All exterior surfaces shall be grit blasted to white metal condition with a 2-3 mil profile. Blasted surfaces shall be cleaned of all dust or blast residue and primed as soon as is practical on the same day blasting is done.
 - b. When priming has dried the coating process will begin. If prime has sat for over twenty-four hours, a refresher coat will be applied.
 - c. Two coats of high solids enamel shall be applied for a total developed film thickness of 5-8 mils.
 - d. Manufacturer is to supply min. 16 oz of high solids enamel touch-up paint.
 5. Internal Components
 - a. The filters shall consist of flex tube elements, filter tube sheet, stainless steel lift shaft and internal flow diversion assembly.

- b. The filter elements shall be flexible tubes that provide the support structure for the media. The outer wall of each element shall be fabricated of multi-filament high strength polyester braid. Each element shall have an internal T304 stainless steel spring, which acts a support structure for the braided filament.
 - c. The filter element tube sheet shall be fabricated of T304 stainless steel and provide both support for the top of the element assembly as well as water tight seal to prevent media from escaping the filter tank.
 - d. The lifts shaft shall be fabricated from T304 stainless steel and provide the internal connection between the filter element tube sheet and the external bump mechanism.
 - e. The filter influent connections shall be fitted with a T316 stainless steel flow diversion assembly to eliminate disturbance to the filter elements during operation.
 - f. All stainless steel wetted fasteners shall be Type 304.
6. Bump Mechanism
- a. The bump mechanisms shall include a pneumatically operated tire mounted externally on the filter tank heads. The tire is alternately pressurized then depressurized causing the connected filter element assembly to move in an upward then downward fashion. This movement shall provide the means of dislodging the media and accumulated solids, which then recoat the filter element.
7. Vacuum Transfer System
- a. The vacuum transfer systems shall be provided to allow the recharging of media into the filter for either bag or bulk media.
 - b. The vacuum blowers shall include a 1.5 HP TEFC 115/230v single phase motor 50/60 Hz.
 - c. In-line filters with dual connections shall be provided to prevent dust and media from being drawn into the blowers.
 - d. Provide three (3) 1-1/2" SCH 80 PVC ball valves: for the vacuum drain line, the blower inlet and the vacuum hose.
 - e. Provide 10 feet of 1-1/2" vacuum hose with required fittings.
8. Automatic Controller
- a. The automatic controllers shall provide total control of the system's filtration and regeneration cycles, and provide all necessary equipment interlocks and timing mechanisms to execute the filter program.
 - b. The controllers shall include an adjustable pressure switch, factory set to 50 psi. The switch shall stop the recirculating pump and close the pneumatic valves if air pressure falls to 50 psi.
 - c. The controllers shall contain a microprocessor that will activate the following functions of the system:
 - 1) Bump cycle / manual or automatic
 - 2) Pre-coating of the filter elements
 - 3) Stopping and starting of the main recirculating pumps
 - 4) Opening and closing of pneumatically operated valving
 - 5) Vacuum transfer system
 - 6) Heater cool down delay
 - 7) Auxiliary contacts to interlock chemical control or other equipment
 - 8) Keyed switch to activate continuous, intermittent bump cycle for flex tube cleaning.
 - d. The controller panel shall display the following functions:
 - 1) Filter status
 - 2) Pre-coat status

- 3) Recirculating pump status
 - 4) Vacuum transfer pump status
 - 5) System power
 - e. The controller enclosure shall be NEMA 12.
 - f. The RMF automatic controller will provide signal power to the main recirculating pump motor starters. The unit is required to be a device or variable frequency drive (VFD) and is to be installed with control wiring by the electrical contractor.
 - g. The RMF shall be 120V, 1 phase, 30 amp rated and shall be UL labeled.
9. Flow Meter
- a. A digital flow meter shall be included with a 4-20mA 0-10 VDC analog output.
 - b. The flow meters shall be wired into the VFDs to provide automatic speed control of the filter pump motors.
 - c. The VFDs shall compensate for varying filter head losses by maintaining the specified flow rate with the 4-20mA output signal of the flow meters.
10. Filter / Regulator
- a. Each filter shall include a combination filter / regulator. The regulator shall be adjustable from 0 – 120 PSI. 1/2" F.P.T. connections shall be provided for field installation of air lines.
11. Water Separator
- a. One water separator with automatic drain shall be included for each air compressor supplied. 1/2" F.P.T. connections shall be provided for field installation of air lines.
12. Pneumatic Actuators
- a. Each filter shall include pneumatic actuators for one (1) influent valve, one (1) effluent valve and one (1) precoat valve.
 - b. The actuators shall be double acting with valve mounted drilling to ISO 5211.
 - c. The actuators shall include two (2) 1/4" FPT ports for open / close connections. Flow control valves with quick connect fittings shall be provided at each port to allow speed control adjustment for the open / close function of the actuators.
 - d. Materials of Construction
 - 1) Body: aluminum alloy, extruded acc. to ASTM 6063, anodized acc. To UNI 4522
 - 2) Ends: Die-cast in aluminum alloy acc. To ASTM B179, epoxy-polyester coated
 - 3) Pistons: Die-cast in aluminum alloy acc. To ASTM B179
 - 4) Pinion: Nickel-plated steel
 - 5) Slideways: Acetal resin (LAT LUB 731320T)
 - 6) Fasteners: AISI 304 Stainless steel
 - 7) Springs: Epoxy coated steel, pre-compressed
 - 8) Seals: NBR Nitrile rubber
 - 9) Lubricant: MoS2
 - e. The actuators shall be factory lubricated to allow for 1,000,000 maneuvers.
 - f. The actuators shall have adjustable travel stops for both directions.
 - g. Working temperature limits: 4°F to 186°F.
13. Fiberglass Eccentric Reducing Flanged Precoat Tees
- a. Eccentric reducing precoat tees shall be constructed of fiberglass with flanged connections. The tee shall be equipped with influent, effluent connections as well as a precoat line branch connection sized in accordance with the drawings.
 - b. Flanged connections shall be ANSI 125# dimensions.
 - c. Reducing tees shall include a 4" F.P.T. gauge connection.

- d. Reducing tees shall be designed for 50 psi operating pressure as manufactured by Neptune-Benson.
14. Solenoid Valves
- a. Each filter shall include four-(4) single solenoid, 4-way valves mounted on a multi-station manifold for operation of the pneumatic actuators and bump mechanism.
 - b. The solenoids valves shall include lighted DIN connectors.
 - c. The solenoid valves shall be factory lubricated and shall not require any field lubrication.
 - d. The solenoid valves with multi-station manifold shall be located on the bottom of the automatic controller, factory wired and include quick connect fittings for attachment to the pneumatic actuators and bump mechanism.
 - e. The solenoid valves shall be SMC Series SY 7000.
15. Valves
- a. All valves 3" – 12" shall be constructed with cast aluminum ASTM S12A housing and fully coated with Rilsan on all interior and exterior surfaces. Internal components include EPDM resilient lining, Rilsan coated ductile iron disc and T304 stainless steel shaft. Valves 14" and larger shall be constructed with cast iron housing fully coated with nylon and with nylon coated ductile iron disc.
 - b. Valves shall be butterfly valves and shall be provided for the influent, effluent and precoat lines.
16. Drain Requirements (By Others)
- a. A sump pit or stand pipe is required for dumping spent media and rinsing tube elements.
 - b. To prevent overflow the sump or stand pipe drain piping shall be sized for 300 GPM capacity.
 - c. If drain piping cannot be sized for 300 GPM, or if the sewer is at an elevation higher than the filter tank drain, use the following minimum sump sizes:
 - 1) Model SP-24: 130 gallons
 - 2) Model SP-27: 160 gallons
 - 3) Model SP-33: 250 gallons
 - 4) Model SP-41: 450 gallons
 - 5) Model SP-49: 620 gallons
 - 6) Model SP-55: 850 gallons
 - d. Use a sump pump to transfer waste to sewer.
17. Packaging
- a. For loading and unloading, filter tank diameters 24" – 41" shall be bolted to individual wooden pallets. All tanks shall be shrink wrapped to prevent damage during transport.
 - b. The components shall be carefully packaged in a totally enclosed wooden crate to prevent damage during transport.
18. Media
- a. Media shall be expanded perlite with a median particle size of 37 microns. Percentage retained on a +150 Tyler Mesh shall not be less than 8% or more than 25%. Darcy permeability shall be at least 1.7 and have a maximum float of 5%.
 - b. The media shall contain no more than 1 tenth of one percent (.001) of crystalline silicate.
 - c. The media shall be certified by the manufacturer for use in the filter. The media shall be NSF listed in Standard 61 and Standard 50.
 - d. The media shall be Harborlite Aquaperl as supplied by World Minerals, Techflo 2000x, or approved equal.
 - e. Each Defender filter shall be provided with six (6) charges of perlite media.

19. Quality Assurance

- a. The Contractor shall have documented at least three (3) completed installations of the proposed filtration system or a qualified manufacturer's representative shall be required for on-site installation supervision.

2.04 RECIRCULATION FITTINGS

- A. Existing main drain covers shall be replaced and sized so that they do not exceed 1.5 ft/sec. All main drain covers shall comply with the Virginia Graeme Baker Act and ANSI/APSP-16 2011.
- B. Adjustable floor inlet fittings shall be provided each consisting of an ABS plastic body and adjusting top plate with a positive locking device. A spanner wrench shall be provided to facilitate flow adjustment. The inlet body shall be provided with a 2-inch cycolac solvent weld connection and internal NPT threads to facilitate line pressure testing. Floor inlet fittings shall be Sta-Rite No. 8417-0000-White or approved equal.

2.05 PIPING SYSTEMS

- A. General
 1. Provide all recirculating piping between the pool and the filter room and all interconnecting piping to and from the chemical feed systems and chemical controller.
 2. Provide all necessary pipe supports and support systems required to support all associated piping and valves.
 3. Provide all other tubing, conduit, or piping associated with equipment specified herein. Coordinate with other trades.
- B. Pipes
 1. Pipe routing as shown and detailed on the contract drawings is diagrammatic only and is not intended to show minor details or exact locations of piping systems. Installation is required to be adjusted to accommodate interference and adjustments anticipated and encountered. Pipe sizes on plans refer to nominal inside diameter of the pipe.
 2. All PVC swimming pool piping shall be NSF approved and conform to the requirements of ASTM D-1785.
 3. All PVC pipes shall be the product of one manufacturer. Approved manufacturers of PVC piping are Eslon, Harvel, and Chemtrol or approved equal.
 4. Swimming pool piping above the floor or deck in the filter room shall be Schedule 80 PVC.
 5. All swimming pool piping under the pool floor shall be NSF approved, Schedule 40 PVC and concrete encased. All transitions between Schedule 40 and Schedule 80 shall be encased in concrete.
 6. All PVC fittings shall be the product of one manufacturer. Molded fittings shall be as manufactured by Asahi, Eslon, Chemtrol, Harvel, Spear, Lasco or acceptable substitute. Fabricated fittings shall be as manufactured by Harrison Machine, Plastinetics, or acceptable substitute.
 7. Chemical feed lines from chemical feeders to recirculation piping shall be Schedule 80 PVC piping. Piping shall be hard piped into the recirculation plumbing. All required valves shall be of all PVC construction.
 8. All flanged plumbing connection hardware shall be stainless steel.

9. All materials shall be installed by workmen thoroughly skilled in their trades and all work shall present a neat and mechanical appearance when complete. The CONTRACTOR, at no additional expense to the Owner, shall replace or correct any work not judged acceptable by the Architect, Owner's testing agency, or their consultants.
 10. All support hardware, brackets, fasteners, hangers, etc. installed in the surge tank shall be 316L stainless steel.
 11. No installation shall be made that will provide a cross-connection or interconnection between a distributing supply for drinking purposes and the swimming pool, or between the pool and a sanitary or storm water sewer system that will permit a backflow of water into the pool water system.
 12. All piping shall be hydrostatically (water) pressure tested for leaks before and after backfilling to guarantee water tightness. Pneumatic (air) pressure test not allowed.
 13. The CONTRACTOR shall provide 1/4" PVC water stops for this work for watertight penetration of concrete walls. Water stops shall be round and the O.D. shall be sized to 150% of the O.D. of the pipe. The water stops shall be thermo-welded to the pipe from both sides and shall be located at the centerline of the wall being penetrated prior to placing the concrete to assure a watertight seal. Manufactured fiberglass and PVC water stop fittings by Daldorado, A.S.A. Manufacturing, or approved equal shall also be acceptable.
 14. CONTRACTOR must adhere to all the applicable provisions in Division 22 - Plumbing, "General Provisions" and "Basic Materials and Methods" for installation of piping system.
 15. All mechanical equipment to be connected into the recirculation piping system shall be done so using flanged or union connections.
 16. Provisions shall be made to purge all pipes in the system.
- C. Pipe Hangers and Supports
1. Manufacturer
 - a. Subject to compliance with these specifications, pipe hanger and support systems shall be manufactured by Cooper B-line (basis of design), Inc, TOLCO, and Anvil International or approved equal.
 2. Hangers
 - a. Pipes 2 inches and smaller
 - 1) Adjustable steel clevis hanger, B-Line models B3100 or B3104.
 - 2) Adjustable steel swivel ring (band type) hanger, B-Line model B3170.
 - b. Pipes 2-1/2 inches and larger
 - 1) Adjustable steel clevis hanger, B-Line model B3100.
 - 2) Adjustable steel yoke pipe roll, B-Line model B3114.
 3. Multiple or Trapeze Hangers
 - a. Trapeze hangers shall be constructed from 12 gauge roll formed ASTM A1011 SS, Grade 33 structural steel channel, 1-5/8 by 1-5/8 inch minimum, B-Line B22 strut or stronger as required.
 - b. Mount pipes to trapeze with 2 piece pipe straps sized for outside diameter of pipe, B-Line B-2000 series.
 4. Wall Supports
 - a. Pipes 2-1/2 inches and smaller
 - 1) Steel offset "J" hook hanger, B-Line model B3600.
 - b. Pipes 3 inches and larger
 - 1) Welded strut bracket and pipe straps, B-Line models B3064 and B2000 series.

- 2) Welded steel bracket B-Line model B3066 or B3067 with roller chair or adjustable steel yoke pipe roll. B-Line model B3120 or B3110.
 5. Floor Supports
 - a. Electroplated carbon steel adjustable pipe saddle and nipple attached to steel base stand sized for pipe elevation. B-Line model B3093 and B3088T or B3090 and B8088. Pipe saddle shall be screwed or welded to appropriate base stand.
 6. Vertical Supports
 - a. Steel riser clamp sized to outside diameter of pipe, B-Line model B3373.
 7. Plastic Pipe Supports
 - a. V-Bottom clevis hangers with galvanized 18-gauge continuous support channel, B-Line models B3106 and B3106V, to form a continuous support system for all plastic pipes smaller than 1 inch or flexible tubing.
 - b. A vented and sloped continuous PVC Schedule 40 pipe no smaller than 1-1/2 inch outside diameter will be used to route flexible tubing with the appropriate pipe supports.
 8. Supplementary Structural Supports - Design and fabricate supports using structural quality steel bolted framing materials. Channels shall be roll formed, 12 gauge ASTM A1011 SS Grade 33 steel, 1-5/8 inch or greater as required by loading conditions. Submit design for pipe tunnels, pipe galleries etc. for approval. Use clamps and fittings designed for use with the strut system.
- D. Hanger Attachments
1. Upper Attachments
 - a. Beam Clamps
 - 1) Beam clamps shall be used where piping is to be suspended from building steel. Clamp type shall be selected on the basis of load to be supported, and load configuration.
 - 2) C-Clamps shall be locknuts and cup point set screws similar to B-Line model B351L or B3036L. Top flange c-clamps shall be used when attaching a hanger rod to the flange of structural steel, B-Line model B3034 or B3033 or approved equal. Refer to manufacturers recommendations for set screw torque. Retaining straps shall be used to maintain the clamp position on the beam where required.
 - 3) Center load beam clamps shall be used where specified. Steel clamps shall be B-Line models B3050 or B3055. Forged steel beam clamps with cross bolt shall be B-Line B3291-B3297 series or approved equal as required to fit beams.
 - b. Concrete Inserts
 - 1) Cast in place spot concrete inserts shall be used applicable, either steel or malleable iron body, B-line B2500 or B3014 or approved equal. Spot inserts shall allow for lateral adjustment and have means for attachment to forms. Select inserts to suit threaded hanger rods sizes, B-line models N2500 or B3014N series.
 - 2) Continuous concrete inserts shall be used where applicable. Channels shall be 12 gauge, ASTM A1011 Grade 33 structural quality carbon steel, complete with styrofoam inserts and end caps with nail holes for attachment to forms. The continuous concrete insert shall have a load rating of 2,000 lbs/ft. in concrete, B-Line models B22I, 32I, or 52I or approved equal. Select channel nuts suitable for strut and rod sizes.
- E. Hanger Accessories

1. Hanger rods shall be threaded on both ends or continuously threaded rods of circular cross section. Use adjustable lock nuts at upper attachments and hangers. No wire, chain, or perforated straps are allowed.
- F. Hanger Finish
1. Hangers shall be zinc plated in accordance with ASTM B633 OR shall have an electro-deposited green epoxy finish.
 2. Strut channels shall be pre-galvanized in accordance with ASTM A653 SS Grade 33 G90 OR shall have an electro-deposited green epoxy finish.
 3. Zinc Plated hardware is not acceptable for use in chemical rooms.
- G. Valves
1. Valves 3 inches and larger shall be butterfly type valves, with PVC body, 150# SWP with stainless steel shaft, polypropylene disc and replaceable resilient seat bonded to a rigid shaft and guaranteed for bubble tight shutoff from 27 inch vacuum to 150 PSI. Extended neck 2 inch beyond flanges for any insulated piping shall be provided with handle for manual operation. All valve components shall be suitable for swimming pool chlorinated water service. Butterfly valves shall be Georg Fischer Type 563, Asahi/America Type SP Pool-Pro, Chemtrol Model-B, Simtech VP series, Colonial Valve 411 Series, or approved equal.
 2. Valves smaller than 3 inches shall be PVC true union ball valves, full port, three-piece construction, blowout-proof stem, Viton seal with socket end connectors.
 3. All valves located 7 feet or greater off the floor shall be fitted with a chain operator.
- H. Pipe and valve identification
1. All exposed pool piping shall be equipped with color coded flow directional arrows at thirty (30) inch intervals per local and state swimming pool health code. The Contractor shall verify that all pool piping identification is in accordance with all local and state health regulations.
 2. All valves shall be identified with minimum 1-1/2 inch diameter brass tags stamped with minimum 1/2-inch high numbers and attached to valves with #16 brass jack chain. (Plastic laminate engraved tags with nylon attachment acceptable.) Valves shall be described as to their function and referenced in the operating instruction manual and wall mounted piping diagram to be prepared by the CONTRACTOR.

2.06 CHEMICAL TREATMENT SYSTEMS

- A. Sodium Hypochlorite (Liquid Chlorine)
1. Chemical feeders for chlorine shall be diaphragm type pumps. Chemical feed pump shall be provided and connected to the filtered water return lines to the pool as shown on the pool plans. The pump shall be capable of feeding a solution to the pool to maintain chlorine (12% sodium hypochlorite) level against the back pressure involved and shall be fully adjustable while in operation.
 2. The pump shall be provided complete with fractional horsepower motor for 120V 60 Hz current, plastic feed lines, and fitting necessary for connections to the pool system piping.
 3. All chemical pumps shall be electrically connected to, and operated by, the water chemistry controllers.
 4. The chemical pump shall be affixed with a metallic stamped label indicating the chemical being pumped and the pool to which it is connected.
 5. Wall mount or provide non-metallic shelf support for the chemical feed pump.
 6. Chemical feeders to be manufactured by LMI, ProMinent, G. H. Stenner & Co., or approved equal.

- a. Pool Chlorine Pump (one required): Model C771-26S 240 GPD
7. All feeder systems to be provided with an injection check valve at point of tap in and strainers with foot valves for suction from 55-gallon drums, carboys or bulk tank. Bulk tank feed shall be from the top.
8. Provide one (1) 150 gallon bulk chlorine solution tank in the chlorine room as shown on the drawings. Tank to be a double wall bulk tank constructed of polyethylene rigid support with top manway and vent. Tank shall be 34" outside diameter by 48" high. Manufacturer shall be Chemtainer, Industries, TC3448DC represented by Steve Golomski of Sun-Day Corporation 314-961-0197 or approved equal.
9. Remote Fill Box
 - a. Provide a remote fill station capable of filling the tank(s) at the rate of approximately 30 to 50 pounds per minute in a manner that does not require entry to the storage room containing the CO2 tank(s). Length of tubing between remote fill box and bulk storage tank shall not be more than 20', unless otherwise noted. Each fill station shall consist of a flush mounted (recessed) lockable fill box located at the exterior of the building, as indicated, connected to the CO2 system. It shall include a quick disconnect and automatic closure coupling. Box shall be 8" x 8" x 2" and constructed of painted 16 gauge galvanized or stainless steel, or sized to module with exterior masonry.
 - b. Tanks are to be connected to outside fill station(s), as indicated, with two lengths of 1/2 inch ODT copper for the purpose: one to transfer liquid to the tanks from a bulk delivery vehicle, and the other from the relief valves to the outside of the building. All copper tubing from remote fill box to storage tank shall be fitted with either double ferrule swage fittings, or silver soldered fittings.
- B. pH Buffering System (Muriatic Acid)
 1. Chemical feeders for muriatic acid shall be diaphragm type pumps. Chemical feed pump shall be provided and connected to the filtered water return lines to the pool as shown on the pool plans. The pump shall be capable of feeding a solution to the pool to maintain pH level against the back pressure involved and shall be fully adjustable while in operation.
 2. The pump shall be provided complete with fractional horsepower motor for 120V 60 Hz current, plastic feed lines, and fitting necessary for connections to pool system piping.
 3. The chemical pump shall be electrically connected to, and operated by, the water chemistry controllers.
 4. The acid pump shall be affixed with a metallic stamped label indicating the chemical being pumped and the pool to which it is connected.
 5. Provide non-metallic wall mounted shelf support for the chemical feeder.
 6. Provide two (2) fifteen (15) gallon acid drums.
 7. Provide one (1) two drum modular spill platform. Platform shall be molded high-density polyethylene with removable polyethylene grating. Platform shall be 26.25" x 51.5" x 6.5" with a spill capacity of 30 gallons and a load capacity of 5,000 pounds. Platform shall be an Eagle two drum modular spill platform model 1632, or approved equal.
 8. Provide one (1) low profile ramp. Ramp shall be molded high-density polyethylene. Ramp shall be an Eagle low profile ramp model 1689, or approved equal.

9. Provide "Vapor Shield" vent check valve for the acid drum/tank which seals container while allowing the liquid to be removed via pump. The Vapor-Shield shall prevent an internal vacuum and collapse of a sealed container. It will also prevent the pump from developing a vacuum-lock while attempting to remove the liquid from the sealed container. The Vapor-Shield shall prevent the release of any acid vapors. The Vapor-Shield body shall be constructed entirely from schedule 80 PVC with polypropylene tube fittings and factory-installed acid resistant viton sealant on all threaded connections. The diaphragm and o-rings shall be constructed of acid resistant viton. No metallic or materials not rated appropriate for use with acid shall be used. The Vapor-Shield shall be fitted with a 3/4" male NPT threaded fitting to allow for the installation onto any common: five (5) through fifty-two (52) gallon acid shipping container caps and lids. The unit shall be supplied with no less than fifteen (15) feet of 3/8" polyethylene tubing. Recreonics catalog no. 52-095. An Acid Fume Scrubber, part #7747090, with refill reagent kit, #7747091, manufactured by ProMinent shall be considered an equal.
 10. Chemical feeders to be manufactured by LMI, ProMinent, G. H. Stenner & Co., or approved equal.
 - a. Pool Acid Pump (one required): Model B121-392SI 60 GPD
- C. Ultraviolet Dechloramination and Disinfection System (**Alternate #6**)
1. Ultraviolet Disinfection Equipment: Shall operate within the UVC electromagnetic spectrum emitting wavelengths in the range of 200nm to 400nm. This required wavelength will provide constant disinfection/inactivation of bacteria, algae, molds, viruses and destruction of Monochloramines, Trichloramines, and Dichloramines. Ultraviolet Lamp/Chamber and Spectra Touch Control Panel by Engineered Treatment Systems or Architect/Engineer approved equal. Any deviation/exception must be provided in writing to and approved by the designer prior to the bid date.
 - a. Ultraviolet disinfection equipment by Aquionics and Prominent are approved equals.
 2. The UV System shall have an MET or equivalent (ETL, CSA, or UL) listing, be NSF-50 2014 certified including Section 14.18 (crypto inactivation) or 3rd party validated to the USEPA UVDGM 2006 Guidelines.
 - a. Equipment General Description: The Ultraviolet System shall be provided in a complete package to include: 316L Schedule 10 Stainless Steel Chamber, Spectra Touch Control System located in a NEMA 12 (IP52) rated panel, Medium Pressure Bulb designed to emit wavelengths within the UVC electromagnetic spectrum, UV EZ Clean strainer, automatic wiper system, and Project Commissioning by a Certified ETS Ultraviolet Technician.
 3. ECF Units: Ultraviolet manufacturer to offer unit capability of a horizontal OR vertical installation application using state of art design and direct flow through characteristics. Direct flow will be required in order to reduce total head loss through the system. Unit shall be a Multiple Lamp medium pressure system with a bulb range of (2) 1.0 kW – (4) 3.0 kW power range. Multiple lamp system is required in order to maintain quality disinfection in the event of a single bulb failure. ANSI or PN (as specified) flange range of 4"/100MM – 12"/300MM and flow pattern of 350 to 3700 GPM (1540 m3/hr to 16,313 m3/hr). @ 94% UVT. Any systems validated or designed for flows based on 98 % UVT are not acceptable. Chamber and Control Cabinet shall be as indicated on the drawings. Electrical requirements are indicated in the table below. The electrical contractor is to take into account plus/minus 3% for external breaker. All required electrical work to be performed by licensed electrician.

| Model Number | Calculated 60 mJ/cm ² (GPM) | Lamps | Power (kW) | Voltage (V) with Breaker Size |
|--------------|--|---------|------------|------------------------------------|
| ECF-210-4V | 350 | 2-1.0kW | 2.0 | 208 V (1ϕ)- 20A 220 V (1ϕ)- 20A |

4. Ultraviolet Chamber
 - a. Pressure rated for 100 psi/8 Bar (tested to 150 psi/11 Bar), and pressure drop across the unit will be minimal. The unit shall be constructed of 316L stainless steel, schedule 10 pipe, passivated to prevent corrosion within the harsh pool environment. The Ultraviolet chamber shall come complete with the following equipment.
 - 1) Ultraviolet intensity monitor factory calibrated to provide intensity in mw/cm², it must include a built-in alarm system to notify operator when output level drops below required level of 60 mj/cm² for indoor pools or 40mj/cm² for outdoor pools (or operator set dosing levels).
 - 2) Ultraviolet temperature control system shall be provided to maintain system integrity in the event of flow interruptions to the chamber.
 - 3) Ultraviolet chamber shall come complete with annealed quartz sleeve with "O" ring seals for water tightness.
 - 4) Chambers shall be complete with ANSI or DN flanges (as specified) and all ports or vents shall be threaded NPT. The Ultraviolet chamber must be capable of installation in the system so that it remains full under all conditions.
 - 5) The Ultraviolet unit must be complete with integrated brackets or feet for ease of installation in either vertical or horizontal mounting.
 - 6) The Chamber shall have a sacrificial anode attached to the chamber, extending inside the chamber and be bonded to the installation bond loop.
5. Ultraviolet Lamp
 - a. Ultraviolet lamp shall be medium pressure high intensity. Lamp shall be designed to emit continuous Ultraviolet wavelengths in the range of 200nm to 400nm. This will provide optimal disinfection benefits and destruction of the Monochloramine, Dichloramine, and Trichloramine compounds. Lamp must remain unaffected by temperature variance of 0 degrees F (-17 C) to 200 degrees Fahrenheit (93 degrees Celsius).
 - b. The lamp system must provide a constant dose of not less than 60 mj/cm² until the end of the lamp life for indoor applications and not less than 40 mj/cm² for outdoor disinfection and this must be based on constantly monitoring the full recirculating flow rate, not on a side stream treatment. The system must be equipped with variable power control to control the intensity & dose of the lamp in 1% increments.
6. Automatic Wiper System
 - a. An automatic cleaning system shall be provided for cleaning of quartz sleeve and Ultraviolet monitor probe. The system shall travel the entire length of the quartz sleeve twice per desired cleaning cycle. Precision molded wiper rings shall be provided to ensure thorough quartz tube cleaning and quartz tube protection. Wiper cycle shall be user selectable and adjustable within a range of 5 minutes to 24 hours depending on anticipated application and deposit build-up.
7. UV Strainer
 - a. The UV system must be provided with a downstream strainer to protect against the possibility of lamp/quartz breakage traveling downstream.
8. Ultraviolet Control System

- a. Control cabinet shall be an ETS SPECTRA Touch control unit and or pre-approved equal. The cabinet shall be an epoxy coated NEMA 12 / IP52 rated cabinet. If mounted outdoors it must be a NEMA4X /IP56 rated cabinet with an integral A/C unit to protect the components from the environment. The power must be controllable to provide full power, half power and infinite variable power based on real time interface with changes in UVT, Flow Rate or Combined Chloramines. Three levels of operation shall be provided to meet the needs of the operator and pool environment: Simple Control (start, stop and reset), Full Parameter Display, and Customized Operator Configuration. Modes of operation shall be password protected to secure system critical setup functions. Touch Control system shall have clearly identifiable start, stop, and reset icons (suitable for gloved operation) with Running and Fault LCD indicators.
 - 1) The main Touch screen shall display a minimum of the following: Ultraviolet calculated dose (derived from flow and intensity inputs), Ultraviolet intensity (as a % and mw/cm²), Lamp Current, Flow rate (accepts signal from optional flow meter – displayed as gallons per minute or m³/hour), Chamber temperature (displayed as deg. F or deg. C), Operation hour meter, and fault indicators to include Lamp fault, low Ultraviolet & temperature alarm, Ground fault trip, Wiper fault. All alarm functions shall have simple text message display to assist in fault finding.
 - 2) Touch Control system shall have a minimum of the following system interface controls: Remote operation, Process interrupt features (from valves, flow meters), Low UV dose (configurable to shutdown or alarm only), Flow meter input, Auto-Restrike, Half to full power Ultraviolet setting with 24 hour/7 day settable timer. Variable power/Dose pacing interface.
 - 3) Touch Control system shall have built in data-logging capabilities to record the following information: Ultraviolet intensity required, Ultraviolet intensity measured, Lamp current, Chamber temperature, Flow rate (if flow meter is connected), Time and date stamp, All alarms generated.
 - 4) Touch Control system must be able to be interfaced with a Chemistry Controller that can measure Total or Combined Chloramines in order to maintain the proper dosage required during the life of the lamp.
 - 5) Touch Control system must be able to interface with any automatic or semi-automatic filtration controller.
 - 6) Touch Control system must be capable of operating through Ethernet or Wi Fi.
 - 7) Touch Control system must be capable of interfacing with a SCADA system including both Profibus and Modbus.
9. System Startup
 - a. Install in accordance with contract documents and manufacturer's instructions.
 - b. Commissioning:
 - 1) Ultraviolet Chamber and Control Panel shall be commissioned by a qualified factory trained technician to institute the warranty.
 - 2) Final electrical and control cabling will be connected from the Touch Control cabinet to the Ultraviolet disinfection chamber during the commissioning process.
 - 3) Daily operation and simple maintenance instructions shall be provided during the commissioning process.

10. Warranty

- a. All components, excluding lamps, quartz and seals, shall have a limited warranty to be free from defects in workmanship and materials for a period of 12 months from date of start-up. Medium pressure Ultraviolet bulbs shall be warranted for a period of 8,000 hours. Intermittently operated lamps (□ 1 on/off cycles per day) will be replaced free of charge should failure occur prior to 4,000 hours and replacement will be prorated between 4,000 and 8,000 hours.
- b. Manufacturer must maintain spare or replacement parts in the USA for same day or not longer than next day delivery in North America.

2.07 WATER CHEMISTRY MONITORING AND CONTROL SYSTEM

- A. The water chemistry control system for the pool shall provide continuous monitoring and control of sanitizers, oxidizers, pH, ORP, free chlorine, total chlorine, combined chlorine, temperature, system flow rate, and water chemistry balance calculations. Installation of the system shall be per the manufacturer's specification and no exceptions shall be allowed. A factory trained/authorized representative shall provide training to the Owner and the training shall be videotaped per 13 1100, Section 1.12 of the project contract documents. The specified controller, a BECSys7 manufactured by BECS Technology, Inc. shall be provided or Chemtrol by SB Control Systems, AcuTrol by Pentair, ProMinent, or a technically equal system capable of providing equal performance for all operating functions.
- B. Certifications
 1. The controller shall carry the following product certifications
 - a. NSF/ANSI Standard 50;
 - b. UL 61010-1
- C. Sensors
 1. The controller shall come with the following sensors
 - a. pH - The controller shall provide a measurement of pH by utilizing a sensor with the following characteristics:
 - 1) 0 – 14 sensing range
 - 2) ABS body with ½" NPT process connection
 - 3) Minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal
 - 4) A porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction
 - 5) A silver/silver chloride (Ag/AgCl) reference element
 - 6) A general purpose glass membrane pH sensing element
 - 7) Operating temperature range of 0 - 80 degrees C
 - 8) Operating pressure range of 0 - 100 psiG.
 - 9) The controller shall continuously monitor, display and data log pH with 0.1 or 0.01 resolution (programmable).
 - b. ORP - The controller shall provide a measurement of ORP by utilizing a sensor with the following characteristics:
 - 1) -1000 to +1000mV sensing range
 - 2) ABS body with ½" NPT process connection

- 3) Minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal
 - 4) A porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction
 - 5) A silver/silver chloride (Ag/AgCl) reference element
 - 6) A solid platinum or solid gold ORP sensing element with a minimum of 1 cm² surface area; platinum-plated and gold-plated sensing elements, which are susceptible to abrasives, shall not be considered equal
 - 7) Operating temperature range of 0 - 80 degrees C
 - 8) Operating pressure range of 0 - 100 psig
 - 9) The controller shall continuously monitor, display and data log ORP with 1mV resolution
- c. Flow Sensor - The controller shall provide a measurement of pool circulation flow rate and volume by utilizing a flow sensor with the following characteristics:
- 1) 0-8800 gpm (0-33265 liter/min) measuring range,
 - 2) Magmeter flow sensor with a frequency output,
 - 3) Dual O-ring seal,
 - 4) Cable to meet length requirement for installation,
 - 5) Saddle to meet return line size,
 - 6) Flow volume: 999 trillion gallons, 1 gallon resolution; 999 trillion liters, 1 liter resolution.
 - 7) The controller shall continuously monitor, display and data log flow rate with 0.1 gpm resolution.
- d. Temperature - The controller shall provide a measurement of water temperature by utilizing a sensor with the following characteristics:
- 1) 32 – 212°F (0 – 100°C) sensing range;
 - 2) 2 wire, 100Ω resistive temperature detector (RTD) with a 0.00385 Alpha.
 - 3) The controller shall continuously monitor, display and data log temperature with 1°F resolution.
- e. Free Chlorine Sensor - The controller shall provide a measurement of free chlorine by utilizing an amperometric sensor with the following characteristics:
- 1) 0.0 to 20.0 mg/l (ppm) measuring range with fully selectable scale,
 - 2) 32° - 113°F operating temperature range,
 - 3) A PVC body,
 - 4) Replaceable PTFE membrane and electrolyte,
 - 5) Gold cathode and silver/silver chloride anode.
 - 6) The controller shall continuously monitor, display and data log free chlorine with 0.1 mg/l resolution.
- f. 4-20mA Sensors
- 1) Total Chlorine Sensor (with Combined Chlorine Reading) - The controller shall provide measurement of total chlorine utilizing a sensor with the following characteristics:
 - (a) 0.0 to 20.0 mg/l (ppm) measuring range,
 - (b) 41° - 113°F operating temperature range,
 - (c) Replaceable PTFE membrane and electrolyte,
 - (d) Gold cathode.

- (e) The controller shall continuously monitor, display and data log total chlorine with 0.1 mg/l resolution. The controller shall also continuously monitor, display and data log combined chlorine (from the total chlorine and free chlorine sensors) with 0.1 mg/l resolution.

B. User Interface

- 1. Standard Display - The standard display shall be a backlit transfective LCD with 14 line x 40 alpha/numeric graphical characters that will continuously display information related to the following:
 - a. All installed sensor readings
 - b. Set points, with current control status
 - c. All active alarms, including time activated
 - d. Smart menus w/ integrated on-screen help
 - e. Contrast adjustment of the backlit LCD shall be provided through clearly marked keys on the front-panel without the need for access to internal controller circuitry. After initial adjustment, controller shall monitor internal temperature and automatically adjust contrast to prevent LCD blackout in extreme ambient temperature conditions. Controllers that do not include front-panel contrast adjustment and automatic temperature compensation shall not be considered equal.
 - f. The standard user interface shall include single-touch access to Set Points, Relay Modes, Calibrations, Backwash status and settings, Menu access, and Reset Fail/Safes. An alphanumeric keypad shall be provided for ease of system configuration.

C. Control Functions

- 1. Water Chemistry
 - a. pH Control: The controller shall continuously control pH. Chemical feed shall be configurable for feed-up, feed-down, or dual feed and either on/off or time-based proportional feed.
 - b. Sanitizer Control: The controller shall continuously control sanitizer based upon the ORP reading, the amperometric sensor, or both with a bracketed control program. Chemical feed shall be configurable for either on/off or time-based proportional feed.
 - c. Bracketed Sanitizer Control: With the amperometric ppm sensor, the controller shall be configurable for bracketed sanitizer control; The bracketed control algorithm shall allow either the ORP or ppm setpoint to be chosen as the primary control point, while using other parameter to create a secondary boundary (min and max settings) that must be maintained in addition to the primary control point.
 - d. Sanitizer Booster Feed: The controller shall have a sanitizer booster program with selectable ORP and/or ppm set points with separate ending set points, allowing the option of the booster sanitizer to control to a lower set point while the primary system can recovers.
 - e. Superchlorination: The controller shall have a programmable superchlorination function, based upon ORP or ppm superchlor setpoint, which is triggered manually.
 - f. Dechlorination: The controller shall have a programmable dechlorination function, based upon ORP or ppm dechlor setpoint, which is triggered either manually or by the completion of the superchlorination function.
 - g. LSI & RSI: The controller shall compute the Langelier Saturation Index and the Ryznar Saturation Index based upon current inputs and the Ca Hardness and Alkalinity entered by the operator.

2. Expanded
 - a. Flow Monitoring: The controller shall continuously monitor, display, and datalog system flow, maintaining a total flow volume. A Low Flow Alarm shall be operator settable, which can be programmed to disable chemical feeds.
 - b. Sensor Wash: The controller shall include a programmable sensor wash with start and end time, feed duration, and number of cycle to allow multiple feed cycles per day.
- D. Control Outputs
 1. Relay Outputs
 - a. Solid-State Relays
 - 1) The controller shall come with a total of 4 integral line or dry contact 5A solid-state relay outputs capable of switching 3A under all normal operating conditions, accounting for the effects of the temperature gradient inside the NEMA 4X enclosure. Systems that utilize relays that are not de-rated must submit an engineering evaluation justifying the use of relays at their full, optimal-condition capacity. All solid-state relays shall have a provision for an electrical interlock with the circulation pump motor starter.
 2. Mechanical Relays
 - a. The controller shall come with a total of 5 mechanical relays:
 - 1) 1 integral 8A dry contact mechanical relay, and
 - 2) 4 integral 3A dry contact or line powered mechanical relays.
 - 3) Since mechanical relays have the inherent risk of failing in the closed (active) position, as a safety measure the controller shall preclude the ability to assign any of the integral mechanical relays to chemical feed functions. Systems that do not preclude mechanical relays from being configured for chemical feeds shall not be considered equal. All mechanical relays shall have a provision for an electrical interlock with the circulation pump motor starter.
 2. Safety Features
 1. Manual-On limit
 - a. The controller shall have built-in limits to the amount of time any relay control output may be forced on (i.e. in "Manual On" mode). This is an important safety feature to prevent control outputs from inadvertently being left forced on after service or diagnostics.
 2. High/Low Alarm Settings & Control Lockouts
 - a. The controller shall have programmable high and low alarm settings for pH, ORP, PPM, temperature, low flow & no flow and chemical overfeed, turbidity, pressure & vacuum, surge tank levels, chemical inventory. The controller shall have a programmable lockout of sanitizer feed upon pH high or low alarm.
 3. No Flow Alarm & Flow Restored Delay
 - a. The controller shall activate a No Flow alarm when the dedicated sample stream flow switch indicates there is insufficient flow through the sample stream. This No Flow alarm shall lockout all chemical feed control operations. The controller shall include a Flow Restored Delay, which shall extend the No Flow lockout user-programmable amount of time after the No Flow alarm ends (i.e. flow is restored). This feature is necessary to assure that the system has valid, stable sensor readings of circulating water prior to making chemical feed control decisions.
 4. Feed Limit Alarms

- a. The controller shall trigger a FailSafe alarm if a chemical feed relay remains on longer than the programmable Feed Limit Timer. Chemical feeds shall automatically be disabled if the corresponding reading goes into a FailSafe alarm condition.
 5. Emergency Off
 - a. The controller shall have a dedicated Emergency Off button on the front panel of the system, which immediately halts all chemical feeds and control outputs when pressed. This feature shall be password protectable, which shall require entry of one of the Security passwords.
 6. Safety shield
 - a. The controller shall include a safety shield or other mechanism for allowing fuse replacement without access to high voltage circuitry or wiring.
- F. Security
 1. The controller shall have three security password levels: six for operators, two for managers and one for the distributor providing for a history of access identified by the user.
- G. Data Logging
 1. The controller shall have 512K battery backed-up RAM for input level recording and events. All input level shall be recorded for 10 to 56 days depending on sample rate (2 to 10 minutes).
 2. The controller shall record and maintain the latest 1100 events over a maximum of 14 days recording all alarms, parameter changes, user logins, and operational cycles related to all control features.
- H. Local Alarms Indicators
 1. The controller shall signal all alarm conditions with the following indicators:
 - a. A bright red flashing LED on the front of the controller,
 - b. Activation of a master alarm signal provided as a dry contact relay enabling the use of 0-240 VAC alarms, and
 - c. Each active alarm listed on the LCD display along with time activated.
- I. Remote Communication, Access & Alarm Notification
 1. Ethernet
 - a. The controller shall come with a standard, integral 100BaseT Ethernet connection. The controller shall be capable of providing Remote Access via PC with Ethernet connection and Alarm Notification via email or text message via an Ethernet connection to the Internet.
 2. Remote Access
 - a. The controller manufacturer shall provide BECSys for Windows™ graphical remote operation software, for interactive connection to the controller from a PC. Remote operation software shall be Vista-compatible, and have all of the following operational modes:
 - 1) Site Data Base – for organizing and accessing multiple controllers on site, or at multiple sites.
 - 2) Graphical Operator's Console – to display current readings, setpoints, alarm points and control status in an easy-to-read graphical mode.
 - 3) Data Log Graphing – to review data logs with time-synchronized event data; data log traces shall be configurable, with color and line style selectable by operator.
 - 4) Full Menu Tree – All system parameters accessible through a full menu tree interface.

- 5) Auto-Polling – to allow automatic download of data logs from all controllers in site database.
3. Alarm Notification
 - a. The controller shall be capable of providing alarm notification to 8 different recipients. Each recipient shall be individually configurable to receive alarm notification by one of the following methods.
 - 1) Email: Notification message shall include system type, serial number, location, system ID, and all active alarm including the date and time each alarm was triggered.
 - 2) Text Message: Notification message shall include system type, serial number, location, system ID, and all active alarm including the date and time each alarm was triggered.
 - 3) Fax: Notification message shall include system type, serial number, location, system ID, and all active alarm including the date and time each alarm was triggered.
 - 4) Numeric Pager: Notification message shall include callback number. Controller shall acknowledge pager notification when callback is received, and not notify subsequent recipients programmed for pager notification.
 4. The controller shall support an MS/TP (RS485) or TCP/IP (Ethernet) BACnet connection to 3rd party applications such as EMS, BMS, BAC and SCADA systems. The BACnet connection shall support access to Inputs (current readings), System Information, Set Points, Alarm Points, Control Status and Alarms. Set Points and Alarm Points shall be modifiable from the 3rd party application via the BACnet interface.
- J. Enclosures
 1. The controller shall be housed in a NEMA 4X polycarbonate enclosure.
 2. Field wiring enclosure - All high voltage field wiring shall be through a separate NEMA 4X enclosure that precludes access to controller electronics. All high voltage connections shall be clearly identified and a field wiring diagram shall be provided with the controller for installer reference. All controller high-voltage relay assignment parameters shall be programmed at the factory prior to delivery to installation location.
- K. Flow Cell
 1. PVC flow cell
 - a. The flow cell shall have a PVC body with two ½" NPT ports for pH and ORP sensors, two ¼"NPT ports for temperature sensor and sensor wash acid injection, and a clear acrylic front viewing window. The flowcell design shall provide precise sample flow rate and water velocity regulation past the probes. The flowcell shall come provided with PVC ½" isolation ball valves, PVC ¼" wet test valve and standard reed or optional rotary flow switch.
 - b. Each flow cell shall be equipped with a pressure-sensing device. The pressure sensor shall consist of a compound pressure/vacuum gauge manufactured in stainless steel, 2 ½" diameter, liquid filled with an operating pressure range of 0 to 60 psig and vacuum of 0 to -30 in./ Hg.
- L. Start-up and Manuals
 1. The control system shall be provided with on-site start-up, on-site operator training, and 1 year on-site warranty service performed by a representative trained and authorized by the controller manufacturer.

2. Manufacturer shall supply an Operation and Maintenance Manual describing features, operating instructions, maintenance procedures and replacement parts.

2.08 FLOW METER

- A. Flow Meter (1 required) shall be installed according to the manufacturer in the filtered water return lines to each of the pools. Flow sensor shall be the GF Signet 2551 insertion magmeter. Provide the coaxial cable from the sensor to the display/transmitter. Flow meter accuracy shall be +/- 2% of reading. The flow instrument shall have an LCD for simultaneous display of four-digit flow rate and eight-digit totalizer. Display/Transmitter capability will be part of chemical controller function or as separate Signet GF Signet 9900 display/transmitter. Signet GF Signet 9900 display/transmitter shall be powered by 24VDC and provide a 4-20mA output.

2.09 WATER LEVEL CONTROLLER

- A. In Deck Water Level Controller
 1. Provide a water level sensing and control system for the pool that will monitor the water level in a well located in the deck at the side of the pool and which will automatically activate the auto water make-up control valve. For sensing water level and activating make-up water control valve for each pool, use Series ELC-810 Controller housed in a watertight NEMA 4X UL94 5V UL flammability rated polycarbonate enclosure to meet IP66 and NEMA 4, 4X, 12 and 13 ratings. The Controller shall utilize one sensor to control water level. ELC-810 series shall have a menu-driven LCD display screen and utilize a five-switch user interface for navigation through the menu. The menu shall allow changing the following settings: delay to shutoff, alternate sensor option, maximum time on, manual override, delay to normal, type of sensor, high level option, flow sensor active, and sounder with alarm. All menu settings shall be capable of password protection. The Controller shall be capable of displaying the following data: last fill time, last drain time, last alarm. The Controller shall be capable of determining the following: maximum time on exceeded, over current to solenoid valve, no valve/valve wiring problem, and sensor not working properly. The Controller shall interlock with auto water make-up solenoid valve and shall provide adjustable time delay for increasing level and manual override; 115 VAC, 1 phase, 60 Hz. Manufactured by AquatiControl Technology, Model ELC-810-SS-DW-XXX (Contractor to coordinate the specific length(s), "XXX," of cable required for each controller prior to ordering). Refer to drawings for additional information. Provided and installed by CONTRACTOR and connected by electrical.
 2. Provide a proximity switch sensor that shall be sensitive to within +/- 1/8" (4mm) of nominal water level. Supply voltage to sensor shall be 12V to 24V DC from Controller. Current consumption shall be < or = 15mA. Response frequency shall be 100Hz. Maximum control output shall be 200mA. Sensor operating temperature shall be -25 Deg. C to 70 Deg. C. Operating humidity shall range from 35% RH to 95% RH. Sensor shall be housed within a fiberglass deck well. The deck well shall consist of two compartments – a wet well connected to the pool via a 1½" static line, and the dry well to consist of a rigid plastic enclosure which houses the sensor and attaches to a ½" static line connected to the wet side. The dry side shall incorporate a 1½" overflow drain and a ¾" female threaded connection to allow connection of sensor cable conduit. Installation of Deck Well at pool side by CONTRACTOR. Coordinate for the provision of conduit from deck well to Controller by Electrical and plug drain from deck well to waste.

3. Wiring from the sensor to the Controller shall be provided and shall be connected to the terminal points mounted within a corrosion-resistant, nonmetallic NEMA 4X enclosure. All wiring connections shall be made through the bottom of the enclosure. The enclosure size shall be no less than 8" wide x 5" high x 4" deep. The access door shall be the entire front face panel of the enclosure. Confirm location of Controller in Field.
4. Major components shall be plugged in using WAGO terminal blocks for ease of installation and replacement. Unit shall be designed to activate a 24-volt AC solenoid valve.
5. Provide a make-up water solenoid valve, normally closed, stainless steel fitted, bronze body, 24 VAC slow closing type. Size to pipe. Interlock with automatic water level control system. Refer to the Drawings for additional information. Such as ASCO, or approved equal.
6. Discharge of the make-up water shall be connected to the filter pump suction line upstream of the isolation valve.

2.10 INSERTS AND ANCHOR SOCKETS

- A. Sockets and anchors shall be provided as stainless steel or cast bronze for swimming pool accessories. The CONTRACTOR shall confirm compatibility of deck equipment and deck anchors with the deck equipment manufacturer. All anchors or sockets shall be provided with flush closure caps and escutcheons with set screws where indicated. Escutcheons shall be of the keyhole or oblong shape, similar to the casted, electro-polished stainless steel escutcheon with set screw by Paragon #28303SS, or approved equal.
 1. Anchor sockets for all railings and grab rails shall be of the wedge type, cast bronze, 4 inches in depth and made to receive 1.50 inch OD tubing as manufactured by Paragon #28105, or approved equal. The wedge shall be cast bronze, incorporate a stainless steel tightening bolt and flat washer, and be designed as the sacrificial element to the anchor system. All metallic components shall be passivated, in compliance with ASTM A967-99, incorporating organic acid passivation techniques for maximum corrosion resistance.
 2. Cup anchors for the lane ropes shall be incorporated into the pool walls. Cup anchors shall be 316L stainless steel with stainless steel threaded eyebolts. The heavy-duty cup anchors shall be 3-3/8" in diameter. Cup anchors shall be Spectrum round cup anchor, part no. 58316, SR Smith Lane Line Wall Anchor, part no. WA-100, or approved equal.
 3. Anchor assembly for pool lift shall be a pair of threaded bronze anchor sockets mounted on a jig. The anchor assembly shall include a grounding lug for proper bonding. Install in accordance with manufacturer's instructions and provide the concrete foundation reinforcing required to properly anchor and support the unit for its intended use. Manufacturer shall provide an anchor that has a completely flush cover or flush plug for times when the lift is not in use.

2.11 DECK EQUIPMENT

- A. Grab rails shall be provided as required in the quantities and to the dimensions as shown on the drawings. Grab rails shall be fabricated of one continuous length of polished and buffed tubing. The tubing shall be ASTM-A-554 grade 316L stainless steel, 1.50 inch OD x .120 inch minimum wall thickness, polished and buffed to 320 grit finish and shall be passivated, in compliance with ASTM A967-99, incorporating organic acid passivation techniques for maximum corrosion resistance. All bends shall be smooth and free of wrinkles. Grab rails shall be figure 4 style with dimensions as indicated in the plans and confirmed with the existing rails on site and as manufactured by Spectrum, SR Smith, Paragon, or approved equal.

- B. Entry rails shall be provided as shown on the drawings, fabricated from one continuous piece of polished and buffed ASTM-A-554 grade 316L stainless steel, 1.500 inch OD x .120 inch wall thickness, polished and buffed to 320 grit finish and shall be passivated for maximum corrosion resistance. Bends shall be smooth and wrinkle free. Custom rails shall be as manufactured by Spectrum Products, or approved equal. Custom rail submittal drawings shall be complete with details of custom fabrication and installation information.
- C. Pool Lifts
1. Battery-Powered Pool lift (1 required) shall be provided with footrest assembly. Lift shall comply with the Americans with Disabilities Act Access Guidelines (ADAAG), be capable of lifting 400 lbs, and shall include a stainless steel anchor socket, cover, spanner key, and a seat belt assembly. The following accessories shall also be provided: caddy, arm rest assembly, lift cover, stability vest, extra battery, wired controls, and spineboard attachment. All stainless steel components shall be 304L. Lift to be a Splash Aquatic Lift, model #300-0000, manufactured by S.R. Smith, the Motion Trek BP 400 model #163145, manufactured by Spectrum Products, or approved equal. Contractor to confirm pool lift fits on pool perimeter and operates correctly.
 2. Hydraulically-Powered Pool Lift (1 required) shall be self-operating with no more than 55-pounds per square inch of water pressure. The lift shall comply with the Americans with Disabilities Act and support a 400-pound load with a 1.5 safety factor. The lifting mechanism shall be a 4 ½-inch stainless steel, open-atmosphere cylinder incorporating a hemispherical shaped piston to facilitate 42-inches of vertical travel. The adjustable base stand, which is to be secured to the deck at two locations 29 5/8-inches O.C., shall accommodate anchor locations at 20 ½ to 30-inches from the pool wall. The access lift shall incorporate the use of two anchors. A valve control handle that requires less than five (5)-pounds of pressure to operate shall be positioned at both deck and pool levels adjacent to the seat at resting position to facilitate totally independent operation. The valve control shall not require continuous manual pressure to operate. All metallic components of the lift shall be passivated 316L stainless steel. The lift and anchor assembly shall carry a five (5) year warranty. Accessory items shall carry a two (2) year warranty. The lift shall be the Gallatin, no. 27336, manufactured by Spectrum Products, and shall be provided with anchor assembly, no. 27450, water box, no. 200400, safety cover, no. 27362, and booster pump, no. 27027. Contractor to confirm pool lift fits on pool perimeter and operates correctly. An Aquatic Access Pool Lift, model IGAT-180 Complete that rotates 180 degrees, meets the specifications listed above, and operates with the gutter configuration shown on the construction documents is acceptable.
 - a. Valve box for hose connection (1 required) shall be an encased, moderate climate ground hydrant for flush with grade or finished floor installation. Valve box shall be complete with all bronze interior parts, replaceable bronze seat and seat washer, non-turning operating coupling with free-floating compression closure valve and ¾" adapter vacuum breaker. Face shall be polished nickel bronze. DCCI box and scoriated hinged cover. Valve box shall be similar to Zurn Z-1375-5 - NB ground hydrant.

2.12 SWIMMING POOL FINISHES

- A. Paint
1. Scope shall consist of the ramp trench and be coated with a high build epoxy. The color shall be white or an approved light color.

2. Coating shall be a low VOC compliant polyamidoamine epoxy suitable for chlorinated water below 3.2 ppm for installation on concrete surfaces. CONTRACTOR shall provide on-site technical services and approval from the coating manufacturer prior to application and during the coating application. Coating shall be Tnemec Series 161HS, Induron Perma-Clean II Semi-Gloss or approved equal. Color shall be white.
3. Surface Preparation
 - a. Cast-In-Place Concrete
 - 1) Allow concrete to cure a minimum of 28 days at 60 deg. F. Brush-off pool interior surfaces, then blast clean to remove laitance and weak surface concrete to produce an anchor profile similar to medium grade sandpaper referencing SSPC-SP13/NACE 6, ICRI-CSP 2-4 Surface Preparation of Concrete. Blasting shall open up surface voids, holes and irregularities. No holes or holidays in the paint membrane will be allowed. Fill with an approved grout or Tnemec Series 215 Surfacing Epoxy, or Induron EFS707 Epoxy Surfacer and Filler, any hole or irregularity that cannot be satisfactorily painted. Do not entirely remove the surface or completely expose underlying aggregate. After blasting, neutralize concrete with a solution of 2 cups aqua ammonia per 5 gallons of water. Flush with clean water and allow to thoroughly dry.
4. Application Procedures
 - a. Before applying any material, measure and record the temperature and relative humidity. Apply only if temperature is above 55 deg. F. and at no lower temperature than 5 deg. F. above the dew point. Do not apply when the relative humidity is greater than 85%. If possible, plan the painting schedule so that all painting is done in the coolest part of the day. Provide proper ventilation so that paint fumes do not become concentrated.
5. Application of the Primer
 - a. After the pool surface has been thoroughly dried and cleaned the primer coat can be applied. Surface spreading rate shall be observed as not to exceed the recommended manufacturer's rate of application. The primer will be applied at a minimum rate of 200 SF per gallon and shall conform to local VOC requirements. A good heavy coat shall be applied. A rough or porous concrete pool will require more paint than recommended. On particularly rough surfaces two coats are recommended in order to provide a smooth, uniform finish. Note: Any marks or irregularities that show through the primer will also be apparent when the finish coat is applied.
6. Application will be made by brush, roll, lambs wool applicator, or spray. When the finish coat is to be a color other than white the primer will be tinted.
7. Application of the Finish
 - a. After the primer is dry enough to walk on without removing or marking surface, apply the finish coat(s) in accordance with the manufacturer's instructions. Application shall be done by the use of a brush, roller, lamb's wool applicator, or spray methods at a rate of 150-250 SF per gallon. Allow a minimum of 5 hours (at 75 deg. F) drying time between coats. Two coats of finish paint are recommended to improve upon general appearance of pool shell. Allow 7 days curing (at 77 deg. F.) before filling the pool.
8. Application of pool striping, depth markings, warning signs and wall targets, shall be done after final coat of finish paint has cured for at least 24 hours.
9. Slip resistant additive shall be applied to the all outdoor areas, entry steps, ramp areas, zero entry and all deck markings.

10. Final paint coating shall be allowed to dry a minimum of 7 days at 35 degree Fahrenheit or above, before filling the pool.

- B. Pool Tile – Reference specification section 13 1103, Swimming Pool Tile.

2.13 WATERPROOFING

A. Products

1. For waterproofing applications that are to receive ceramic tile finish: Apply two (2) coats of MAPEI AquaDefense or LATICRETE Hydro Ban directly to surface of the pool structure. Prior to the application of the waterproofing material thoroughly inspect the structure for cracking and repair cracks as needed. Upon completion of proper curing apply flexible or polymer modified thinset tile adhesive over top coat.
2. Apply LATICRETE Hydro Ban directly to the ramp trench and provide with a thin set smooth troweled finish. Provide epoxy paint finish over the cement-based protecting latex thin set mortar coating.

B. Surface Preparation

1. Surface shall be structurally sound and free of any foreign substances and debris that could reduce or impair adhesion. Surfaces shall be roughened by sand blasting, water jetting, shot blasting, scarifying, or grinding. Surface defects or holes shall be patched per manufacturer's recommendations.

C. Application

1. Do not apply materials under conditions where the ambient air temperature is less than 40 degrees Fahrenheit, or to a frozen substrate.
2. All mixing of products, quantities and application procedures shall be done in accordance with the manufacturer's recommendations.

2.14 SEALANTS

- A. Provide sealed expansion joints as shown on the drawings or noted on the Contractor's construction/expansion joint layout, and as required. Expansion joints shall be constructed and sealed as indicated and in accordance with the manufacturer's recommendation. Sealant to be manufactured by LATICRETE International, Inc., Mapei, or Deck-O-Seal.

1. For submerged joints:

- a. Latasil, one component, neutral cure, high performance, 100% silicone sealant in the color(s) as selected. Shall be used in conjunction with Latasil 9118 Primer per manufacturer's recommendations.
- b. Mapesil T, 100% silicone sealant in the color(s) as selected.

2. For joints behind the coping, or other horizontal deck joints:

- a. Deck-O-Seal, two component (gun-grade or pourable, self-leveling), high resilience, non sag, non flowing, polysulfide-based sealing compound in the color(s) as selected. Shall be used in conjunction with P/G Primer per manufacture's recommendations.

B. Material Storage

1. All materials are to be stored in the original unopened factory containers in a cool dry location 60 to 80 degrees F. Protected from the elements and the hazards of construction. Open only as many containers as can be used in any particular period.

C. Joint Preparation

1. Clean the joints of all deleterious material, to sound, clean and dry substrate.

2. If the joint is existing and part of a renovation, inspect and verify that all joints have firm, solid sub-surface support up to the underside of the structural slab. Identify those joints that do not have such support and fill any voids under the joint with a cement slurry (being careful not to fill the joint space itself) consisting of the following:
 - a. Two (2) parts water (by weight) 10 gallons
 - b. One (1) part Portland cement 47 lb bag
 - c. $\frac{1}{4}$ to $\frac{1}{2}$ part bentonite $\frac{1}{2}$, 50 lb bag
 3. In mixing the slurry it is recommended that the water be added first, then the cement, and finally the bentonite. The more bentonite the faster the set. Do not get the slurry on the joint itself.
 4. Joint is to be formed or filled with an approved, resilient, non-asphaltic, closed cell, polyethylene joint filler material down to firm substrate. Allow space at the top of the joint for the installation of approved closed cell polyethylene backer rod and install same to the required depth below the surface of the slab to control the depth of the sealant bead to within manufacturer requirements.
- D. Surface Preparation
1. Concrete surfaces to receive sealant must be fully cured, clean, dry and free of dirt, dust and any deleterious material that might compromise the adhesion and performance of the sealant. Curing aids, form release agents and joint former residue must be completely removed, if necessary by sand blasting and/or grinding. Loose dust must be brushed off.
 2. Prime all surfaces to receive Latasil sealant with Latasil 9118 Primer prior to sealant application, and surfaces to receive Deck-O-Seal sealant with P/G Primer prior to application.
- E. Application
1. Apply sealant in accordance with the manufacturer's recommendations.
 2. Tool the joint immediately after application to insure a firm, intimate contact with the joint interface.
 3. Remove excess sealant and smears from adjacent surfaces with Xylol or Toluol before sealant cures.
 4. After the sealant has fully cured (generally a minimum period of five days at 72 degrees and 50% humidity), paint the surface of the sealant with a chlorine resistant chlorinated rubber or equivalent pool paint, such as Ramuc, in a compatible color as selected by the Architect. NOTE: Latasil cannot be painted.

PART 3 - EXECUTION

3.01 EXISTING CONDITIONS, INSPECTION AND PREPARATION

- A. Carefully examine all of the contract documents for requirements that affect the work of this section. Prior to starting any work, notify the General Contractor of defects requiring correction. Do not start work until conditions are satisfactory.
- B. Verify that all work by others, related to this section, has been completed. This includes all earthwork, concrete work, and mechanical, electrical and plumbing connections.
- C. Protect all materials and work completed by others from damage while completing the work in this section.

3.02 FIELD MEASUREMENTS

- A. Verify benchmark and pool location prior to layout.
- B. If field measurements differ from the construction drawing dimensions, notification shall be given to the Architect prior to proceeding with work.

3.03 EXCAVATION, REINFORCING STEEL AND SWIMMING POOL CAST-IN-PLACE CONCRETE

- A. Reference Division 3 - Concrete

3.04 TOLERANCES FOR CONSTRUCTION OF THE POOL SHELL

- A. The completed structures shall be constructed level and to the dimensions, elevation, depths and thickness as shown on the plans.
- B. The elevation tolerance of the pool shell and gutter lip shall be plus or minus 1/8 inch.
- C. The vertical wall surface tolerance of the pool shell, for the first 36 inches from the water surface shall be plus or minus 1/4 inch from plumb measured with a 6 foot straight edge.
- D. Ground wires or grade pins, if used, shall be installed in such a manner that they accurately outline the section of the pool shell as indicated on the plans. They shall be located at intervals sufficient to insure proper thickness throughout and shall be maintained tight. Grade pins or grounding wires shall not be permanently embedded in the pool shell.

3.05 WATER TIGHTNESS TEST

- A. This test applies to the pool. The water tightness test shall be completed prior to the application of any pool finish products.
- B. Water Tightness Test Procedure
 - 1. Preparation
 - a. Allow the concrete structure to set 28 days for curing purposes. Once the pool shell has gained sufficient strength to withstand the test load and after all the outlets have been securely sealed, the pool shall be filled with water.
 - 2. Fill: Fill and then isolate the pool. The water tightness test shall begin after the vessel has been filled for a minimum of three (3) days. During the filling, all outlets shall be monitored for water tightness and all concrete joints shall be monitored for any visible leakage. If any visible leakage from the vessel is observed, the condition shall be corrected prior to the start of the test.
 - a. After the initial fill, all ground water shall be removed from the pool sight sump or the pool location de-watering system. This shall be completed prior to the start of the water tightness test. De-watering of the pool sight sump shall be maintained during the entire duration of the test.
 - 3. Evaporation Measurement Procedure
 - a. Fill a floating, restrained, partially filled, calibrated, open container with water and allow the container to float within the pool during the testing period. This will be used to measure evaporation.

4. Measurement
 - a. On a separate sheet of paper draw a sketch of the pool. Measurements shall be taken at the pool. Multiple test points with averaging are recommended for vessels which will be exposed to wind. Document the separate findings on the chart below. Repeat the measurements and document every 12 hours for a total of three (3) days. The General Contractor shall check the pool for water loss with the Architect or Owner's representative every 12 hours. The Contractor shall submit photo documentation of each measurement with the completed water tightness report.

| | | | |
|-----------------------------|------|---------------------|------------------------------------|
| Total Allowable Water Loss: | | Total Volume: | Allowable Loss (0.1%) x 0.001 = |
| | | _____ | _____ |
| Pool Measurements | Pool | Pan Measurements | |
| 12 Hrs. | | | |
| 24 Hrs. | | | |
| 36 Hrs. | | | |
| 48 Hrs. | | | |
| 60 Hrs. | | | |
| 72 Hrs. | | | |

5. Total Loss = 7.481 x Structure Surface Area (SF) x Total Water Loss per Day (FT) – Evaporation per Day (FT) + Precipitation per Day (FT)
 - a. Day #1 =
 - b. Day #2 =
 - c. Day #3 =
6. Repair
 - a. The allowable leakage rate for an unlined pool structure shall not exceed 0.1 percent of the total water volume in a 24-hour period. (Example: 0.001 x 200,000 gallon pool = 200 gallons per 24 hour period.) This excludes the loss/addition of evaporation/precipitation.
7. Absorption
 - a. Waiting 3 days after the initial water fill will allow the concrete to absorb water and shall be sufficient to minimize the effect of absorption on the test results.
8. If leaks are detected, repair the vessel and make water tight in accordance with these requirements.
9. With regard to this test, the curing requirements, the final fill and the cost of the water for two (2) complete fillings shall be borne by the Owner. Any subsequent fillings or partial fillings (more than 25%) of the pool shall be by the CONTRACTOR, at its own expense.

3.06 PIPING INSTALLATION

A. General

1. Provide and erect, according to the best practices of the trade, all piping shown on the drawings and required for the complete installation of these systems. The piping shown on the drawings shall be considered as diagrammatic in indicating the general run and connections, and may or may not in all parts be shown in its true position. The piping may have to be off set, lowered or raised as required or as directed at the site. This does not relieve the CONTRACTOR from responsibility for the proper erection of the systems or piping in every respect suitable for the work intended as described in the specifications and approved by the Architect. In the erection of all piping, it shall be properly supported and proper provisions shall be made for expansion, contraction and anchoring of piping. All piping shall be cut accurately for fabrication to measurements established at the construction site. Pipe shall be worked into place without springing and/or forcing, properly clearing all windows, doors, and other openings and equipment. Cutting or other weakening of the building structure to facilitate installation will not be permitted. All pipes shall have burrs and/or cutting slag removed by reaming or other cleaning methods in strict accordance with the manufacturer's instructions. All changes in direction shall be made with fittings. All open ends of pipes and equipment shall be properly capped or plugged to keep dirt and other foreign materials out of the systems. Plugs of rags, wool, cotton waste or similar materials will not be used in plugging. All piping shall be arranged so as not to interfere with removal and maintenance of equipment, filters or devices, and so as not to block access to manholes, access openings, etc. Flanges or unions as applicable for the type of piping specified shall be provided in the piping at connections to all items of equipment. All piping shall be installed to ensure noiseless circulation. All valves and specialties shall be so placed to permit easy operation and access.

B. Pipe Hangers and Supports

1. Pipes shall be adequately supported by pipe hangers and supports specified in Part 2.
2. Horizontal PVC Schedule 80 piping shall be supported in accordance with the manufacturer's recommendations for fluid temperature not exceeding 120 degree F and as listed below:

| Nominal Pipe Size | Hanger Support Spacing | Minimum Rod Size for Single Rod Hanger |
|-------------------|------------------------|--|
| 1-1/4" and less | 5'-0" | 3/8" |
| 1-1/2" to 3" | 6'-0" | 1/2" |
| 4" to 6" | 8'-0" | 5/8" |
| 8" to 12" | 10'-0" | 7/8" |
| Greater than 12" | 12'-0" | 1" |

- C. Provide means of preventing dissimilar metal contact such as plastic coated hangers, copper colored epoxy paint, or non adhesive isolation tape.
- D. Install hangers to provide a minimum of 1 inch space between finished covering and adjacent work.
- E. Place a hanger within 12 inches of each horizontal elbow.
- F. Support vertical piping independently of connected horizontal piping. Support vertical pipes at every floor. Wherever possible, locate riser clamps directly below pipe couplings or shear lugs.

- G. Where several pipes can be installed in parallel and at the same elevation, provide trapeze hangers as specified in Part 2. Trapeze hangers shall be spaced according to the smallest pipe size, or install intermediate supports according to the support spacing schedules.
- H. Do not support piping from other pipes, ductwork or other equipment that is not building structure. Do not modify building structure for hanger installation.
- I. Concrete Inserts
1. Provide inserts for placement in form work before concrete is poured.
 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 3. Where concrete slabs form finished ceilings, provide inserts to be flush with the slab surface.
 4. Provide hook rods to concrete reinforcement section for inserts carrying pipe over 4 inches.
- J. Pipe Hangers and Supports
1. All piping shall be rigidly supported from the building structure by means of hanger assemblies properly selected and sized for the application in accordance with the manufacturer's recommendations and specifications.
 2. All piping in a service tunnel, if required shall be supported by a structure of the CONTRACTOR'S design. The structure shall be non-corrodible and shall be of a size and configuration to rigidly support all the piping as shown in the plans at a minimum spacing as shown below.
 3. Piping hangers shall be spaced per the below schedule and shall have hangers not more than one foot on each side of every change in direction. The piping systems shall be installed in an approved manner and shall not overload the building structural frame. The CONTRACTOR shall provide additional hangers and miscellaneous steel supports as required to distribute the piping system load over several structural members where required or directed. Maximum allowable spacing for piping shall be as follows:

| <u>PVC Piping</u> | <u>Maximum Spacing</u> |
|-------------------|------------------------|
| 3/4" through 2" | 5'-0" |
| 2 1/2" through 4" | 6'-0" |
| 6" through 10" | 9'-0" |
| 12" through 14" | 12'-0" |
 4. Round rods supporting the pipe hangers shall be of the following dimensions:

| | |
|-------------------|-----------|
| 1/2" to 2" pipe | -3/8" rod |
| 2-1/2" to 3" pipe | -1/2" rod |
| 4" to 5" pipe | -5/8" rod |
| 6" pipe | -3/4" rod |
 5. Hanger rods shall be galvanized steel. Provide for controlling level and slope by turn buckles or other approved means of adjustment and incorporate lock nuts.
 6. Where piping is installed side by side, the CONTRACTOR will support the piping by utilizing trapeze type hanger assemblies. Horizontal trapeze member shall be non-metallic channel. The CONTRACTOR shall provide heavier members as required for the load to be supported for the entire span distance. Hanger rods shall be as specified above and properly sized for the load supported, but not less than 5/8 inches diameter.
 7. The use of pipe hooks, chains, or perforated iron for pipe hanger supports will not be permitted.

8. Attachment of piping hangers to the building structure shall be provided in a manner approved by the Architect. The CONTRACTOR shall provide concrete inserts to be installed by the General Contractor in the building construction at the time the concrete is poured and hangers shall be attached to these inserts.
- K. Piping Installation
1. Trench bottoms shall be smooth and free of rocks and debris. If the trench is dug in ledge rock, hardpan or where large boulders are not removed, place 3 inches of sand or compacted fine-grained soil below pipe. Pipe must be supported over its entire length with firm, stable material. Blocking will not be used to change pipe grade or provide intermittent support over low sections in the trench. Surround the pipe with backfill meeting the requirements of Section 31 2000 with a particle size of 1-1/2 inch or less and in accordance with the project geotechnical report. Compact in layers not to exceed 6 inches with vibratory method. Follow installation methods of ASTM D2774 "Underground Installation of Thermoplastic Pressure Piping".
 2. Installations are to be installed in a straight run of pipe, with a minimum 10 pipe diameters upstream and minimum 5 pipe diameters downstream of any pipe fitting.
- L. Flushing, Draining and Cleaning Pipe Systems
1. The CONTRACTOR shall flush out all water systems with water before placing them in operation. Other systems shall be cleaned by using compressed air or nitrogen. After systems are in operation and during the test period, all strainer screens shall be removed and thoroughly cleaned.
- M. Expansion and Contraction
1. The CONTRACTOR shall make all necessary provisions for expansion and contraction of piping with offsets, loops, flexible connections and anchors as required to prevent undue strain. The CONTRACTOR shall provide shop drawings for proposed method and arrangement for control of expansion and contraction of piping.
- N. Testing
1. All piping installation and pressure testing shall be reviewed by the Owner's testing agency before commencement of backfilling. A minimum notice of one (1) week is required prior to review. Results of review shall be documented.
 2. All pool related piping, shall be hydraulically pressure tested (with water, not air) to a pressure of not less than 50 PSI for a period of no less than two (2) hours.
 3. Contractor is responsible for the maintenance of a sustained 20 PSI pressure on all pool related piping throughout the course of construction.
 4. The Contractor shall adhere to the applicable provisions of Division 22 - Plumbing, "General Provisions" and "Basic Materials and Methods" for installation of piping system.

3.07 EQUIPMENT AND SYSTEMS INSTALLATION

- A. The CONTRACTOR shall assemble and install all equipment, special parts and accessories as shown on pool drawings, specifications and shop drawings of the equipment suppliers.
- B. The CONTRACTOR shall provide all anchors and inserts to be imbedded in the deck including all fittings, inserts and structure sleeves and required anchorage as shown on the plans and as indicated in this section of the specifications. Equipment shall be set true and plumb, using factory jigs where available. Removable equipment items shall be easily removable from anchors and shall fit without noticeable wobble.

- C. Provide templates for all equipment anchors. Provide anchor bolts of the size and spacing as required by the equipment manufacturer. All anchor bolts shall be stainless steel Type 316L and of a length capable of adequate anchorage into rough slab-on-grade allowing for finish deck tile and setting bed. Anchors shall be set and cast into place during building concrete work. Inspect all anchor settings for horizontal and vertical alignment prior to placing concrete.
- D. The CONTRACTOR shall install all equipment and systems in accordance with manufacturer's directions. Equipment shall all be assembled and in place for final observation.
- E. All items necessary to complete this section are shown on the plans or described in the specifications including items that may be purchased by the Owner. Items are detailed and specified as a guide for dimensional purposes. The CONTRACTOR must make provisions accordingly and submit shop drawings and submittals based on that data.

3.08 START-UP AND INSTRUCTION

- A. The CONTRACTOR shall supply the services of an experienced swimming pool operator/instructor for a period of not less than two days (total 16 hours) after the pool have been filled and initially placed in operation. During this period, the Owner's representatives who will be operating the pool shall be thoroughly instructed in all phases of the pool's operation. The CONTRACTOR shall deliver six (6) complete sets of operating and maintenance instructions for the swimming pool, structures, finishes and all component equipment. Prior to leaving the job, the CONTRACTOR shall obtain written certification from the designated Owner's representative acknowledging that the instruction period has been completed and all necessary operating information provided. The CONTRACTOR shall, in his contract, include the cost of two (2) additional days (total 16 hours) of instruction and operational check out by the qualified representative of the CONTRACTOR during the first season of operation.
- B. Written reports of each of these visits outlining the pool's operation, competence and performance of the pool's operation personnel, and other pertinent comments shall be submitted to the Owner and Architect/Engineer within one (1) week after each visit.
- C. The CONTRACTOR shall provide specific written procedures to be followed for emptying and refilling the pool as mentioned previously in this section. The procedures must be included in the bound volume of operating instructions and references in the front index with a note headed by the words: "CAUTION -- VERY IMPORTANT".

END OF SECTION

SECTION 13 1103 - SWIMMING POOL TILE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The drawings and General Provisions of the contract, including General and Supplementary Conditions apply to work of this section.

1.02 SUMMARY

- A. The contractor shall be required to sound test the existing swimming pool tile finish to determine the extent of any tile that has delaminated from the substrate. In the contractor's base bid pricing, 500 SF of existing tile shall be allocated for removal which will include de-bonded areas, deteriorated or damaged tile, existing tile that has been stained from reinforcement bleed-through and other metallic corrosion, and around fittings that require remediation. This 500 SF does not include the new ramp addition which shall also receive a ceramic tile finish. Contactor to furnish unit pricing per 100 SF for interior pool tile replacement beyond the initial 500 SF. All areas of existing tile that are to remain that have grout erosion or discoloration shall be removed, the surface prepared, and replaced with cementitious-based grout.
- B. The CONTRACTOR shall furnish and install the work of this section.

1.03 RELATED SECTIONS

- A. Division 1 – Mock Ups
- B. Division 7 - Joint Sealers
- C. Division 9 - Ceramic Tile
- D. Section 02 4119 - Selective Demolition
- E. Section 13 1100 - Swimming Pool

1.04 QUALITY ASSURANCE

- A. Reference Standards: Conform to the following standards unless otherwise required herein.
 - 1. American National Standards Institute (ANSI)
 - a. A108.01 – General Requirements: Subsurfaces and Preparations by Other Trades.
 - b. A108.02 – General Requirements: Materials, Environmental, and Workmanship.
 - c. A108.1, Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile installed with Portland Cement Mortar.
 - d. A108.1C – Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry Set or Latex-Portland Cement Mortar.
 - e. A108.5 – Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - f. A108.10 – Installation of Grout in Tile Work.
 - g. A108.13 – Installation of Load Bearing, Bonded, Waterproof Membranes for Thin Set Ceramic Tile and Dimension Stone for the Waterproofing Membrane Installation Process
 - h. A137.1 Standard Specifications for Ceramic Tile.
 - 2. American Society for Testing and Materials (ASTM)
 - a. C144-99, Aggregate for Masonry Mortar

- b. C150-00, Portland Cement
 - c. C171-97a, Sheet Materials for Curing Concrete
 - d. C206-97, Finishing Hydrated Lime
 - e. C207-91 (R1997), Hydrated Lime for Masonry Purposes
 - f. D5957, Standard Guide for Flood Testing Horizontal Waterproofing Installations
 - g. F-1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - h. F-2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes
3. Tile Council of North America (TCNA); 2013 Edition, Handbook for Ceramic Tile Installation.
 4. International Standards Organization (ISO)
 - a. ISO 13007 – Part 1: 2004 Ceramic Tiles – Grouts and adhesives; specifies the value of performance requirements for all tile adhesives.
 - b. ISO 13007 – Part 2: 2005 Ceramic Tiles – Grouts and adhesives; test method for adhesives.
 - c. ISO 13007 – Part 3: 2005 Ceramic Tiles – Grouts and adhesives; terms, definitions and specifications for grout.
 - d. ISO 13007 – Part 4: 2005 Ceramic Tiles – Test methods for grout.
 5. American Concrete Institute
 - a. ACI 302 – Guide for Concrete and Floor Slab Construction
 6. International Concrete Repair Institute (ICRI)
 - a. Concrete Surface Profile (CSP)
- B. Tile installers shall have two years experience in similar pool projects which the Owner may require written proof thereof and proper tools to install tile.

1.05 MANUFACTURERS

- A. Subject to compliance with requirements provide ceramic tile, mortar and grout of the following manufacturers: American Olean Tile Co. (tile), Dal-Tile Co. (tile), Buchtal (tile), KlinkerSire (tile), Mapei Corp. (thin-set, waterproofing, grout and admixtures), and Laticrete International Inc. (thin-set, waterproofing, grout and admixtures) or approved equal.

1.06 SUBMITTALS

- A. Submit shop drawings indicating tile layout, patterns, joint layout, color arrangement, perimeter conditions, junctions with dissimilar materials, thresholds and setting details.
- B. Submit product data indicating material specifications, characteristics, and instructions for using adhesives and grouts.
- C. Samples:
 1. Mount tile and apply grout on 24 x 24 inch backerboard to indicate pattern, color variation and grout joint size variations of each pattern. Furnish mounted tile samples as requested by the architect/owner.
- D. Submit manufacturer's installation instruction.
- E. Submit maintenance data.
 1. Include recommended cleaning and stain removal methods, cleaning materials.

1.07 PRODUCT DELIVERY AND STORAGE

- A. Deliver tile materials to site in unopened factory containers sealed with grade seals bearing printed name or manufacturer and the words "Standard Grade". Keep the grade seals intact and containers dry until tiles are used. Keep cementitious materials dry until used.

1.08 JOB CONDITIONS

- A. Inspect and verify job conditions. Report all defects in base surfaces for correction before proceeding.
- B. Maintain a temperature range of 40 degrees Fahrenheit to 90 degrees Fahrenheit during installation of tile and grout materials. Tile installation should cure for a minimum 14 days with average an temperature of 70 degrees, while maintaining the minimum 40 degrees and maximum 90 degrees Fahrenheit, prior to filling pool with water.
- C. Vent temporary heaters to outside to avoid carbon dioxide damage to the new tile work.

1.09 COLORS

- A. Colors to be selected by the Architect or Interior Designer. Note that swimming pool regulations may dictate color selections within the pool tank. See 2.01 Tile Materials for price group breakdowns.

1.10 WARRANTIES

- A. The CONTRACTOR warrants to the Owner that materials and equipment furnished under the contract will be of good quality and new unless otherwise required or permitted by the contract documents, that the work will be free from defects not inherent in the quality required or permitted and that the work will conform with the requirements of the contract documents. Work not conforming to these requirements including substitutions not properly approved and authorized, may be considered defective. The CONTRACTOR'S warranty excludes remedy for damage or defect caused by abuse, improper or insufficient maintenance, improper operation, modifications not executed by the CONTRACTOR or improper wear and tear under normal usage. If required by the Owner, the CONTRACTOR shall furnish satisfactory evidence as to the kind and quality of materials and equipment. All warranties shall be for a period of five years, unless otherwise specified.
- B. All setting materials shall be provided by the same manufacturer. All mixing materials and application procedures shall be done in accordance with manufacturer's recommendations and requirements. Documentation shall be provided to this effect by the contractor with verification from the manufacturer. This documentation shall be included in the operations and maintenance manual under warranties as documentation qualifying the project for a 15 Year Systems Warranty by Laticrete International, Inc., Mapei, Inc. or approved equal.
- C. The CONTRACTOR shall agree to repair or replace any work at no cost to the Owner upon written notification from the Owner within the warranty period. Pro-rated warranties are not acceptable.

PART 2 PRODUCTS

2.01 TILE MATERIALS

- A. Standard grade conforming to ANSI A137.1. Provide trimmer units as indicated and specified, including special shapes as detailed or required. Tile patterns and colors shall be as indicated and specified, colors of approved shades. Mesh mounted or perforated paper backed tile is not allowed where the mesh of paper remains as a permanent part of the installation. If dot mounting is used, a minimum of 67% of the depth of the tile shall be free from any dots to ensure proper grout curing. All 1" x 1" tiles shall be face mounted as guaranteed suitable for pool use by the manufacturer.
- B. All tile shall be "frost-proof".
- C. Unglazed Ceramic Mosaic Tile
 - 1. Slip-resistant porcelain unglazed ceramic mosaic tile, cushion or all-purpose edges, one inch square from price group 2 for floor, walls, and stair treads unless otherwise noted. Minimum dynamic coefficient of friction shall be 0.42 for wet surfaces and 0.65 for ramped surfaces. Where (special shapes) are required they shall be selected from price group 3. Equivalents provided by Dal-Tile or American Olean. For wet surfaces: American Olean Unglazed color-body porcelain mosaics 1"x1", price group 1-3. For ramps: Dal-Tile or American Olean Unglazed color-body mosaics 1"x1" with 7.5% abrasive grain (7 color options). All colors to be selected by the architect.
 - 2. Ceramic tile band below the crown detail at ramp shall be selected by Architect from Dal-Tile, Keystone Unglazed Mosaic, 1"x1" price group 4, or American Olean Unglazed color-body porcelain mosaics 1"x1" price group 1-3
 - 3. Ceramic tile deck band that contains the depth marker letters and numerals shall be selected by the Architect from Dal-Tile, Keystone Unglazed Mosaic, 1"x1", price group 4, American Olean Unglazed color-body porcelain mosaics 1"x1", price group 1-3.
- D. Handhold Tile at pool perimeter shall be provided as C701 available from Dal-Tile.
- E. Provide tile trim units where indicated or necessary for a complete and finished installation. Provide rounded units for external and internal corners and angles. Provide trim units of material and finish identical to the adjoining tile. Provide SCR/L701 units where the C701 hand hold is interrupted to permit draining. Contractor should request via non-standard production. The SCR/L701 units are available through DalTile at 314-997-6970 or 1-800-672-2086.
- F. Message Tile and Depth Markings
 - 1. Deck messages shall be provided in 1 inch x 1 inch unglazed ceramic tile using "special" characters minimum five inch high as described in American Olean "Ceramic Tile for Swimming Pools" booklet 805 or by Inlays, Inc. Provide 5 inch high vertical depth markers on the wall just above the water line. All message tile shall contrast with the field tile. Refer to Architect for color selections.

2.02 SWIMMING POOL TILE SETTING MATERIALS AND INSTALLATION

- A. Refer to section 13 1100. Contractor to provide tile and setting materials over a waterproof membrane as noted in this section. Refer to and coordinate with the Architectural Drawings for extent and detailing. Coordinate for installation, interface, and flashing between pool and deck waterproofing systems. Confirm all installation requirements with the manufacturer.

B. Surface Preparation

1. Surface preparation shall be in accordance with ACI 302. The surface shall be structurally sound and free of any foreign substances and debris that could reduce or impair adhesion. Sound and remove all loose concrete to firm substrate. Surfaces shall be roughened by bead blasting to a CSP of 2 or 3 (reference ICRI CSP Standards 7 to 9 for acceptable profile height). Thoroughly wash/rinse with clean potable water. Surface defects or holes in the substrate shall be patched per manufacturer's recommendations.
2. Moisture vapor emissions rate (MVER) when measured with a calcium chloride test (ASTM F-1869) shall be less than 5 lbs per 1000 SF per 24 hours. Relative humidity shall be measured with a probe and shall be less than 75%.
3. At the conclusion of all surface preparation and prior to the installation of the tile, measure the pH level of the substrate. Tile work components shall not be installed until the pH has a value less than 10.

C. Mortar Bed / Render and Scratch Coat

1. Bonded Thick Bed Method (Floor / Horizontal Surfaces): Provide a dry pack, thick mortar bed on horizontal surfaces consisting of either Laticrete 3701 Fortified Mortar Bed, or Mapei, 4:1 bag mix with Planicrete AC Additive. Apply over a properly prepared slurry bond coat. Maximum lift thickness not to exceed 2".
2. Render- Scratch and Float Coats (Wall / Vertical Surfaces): Provide wall render (scratch and float coats) on vertical competition turning surfaces to a depth of 4 feet below the water surface, consisting of either Laticrete 3701 Fortified Mortar Bed (formerly Laticrete 226 Thick Bed Mortar mixed with Laticrete 3701 Admix now polymer modified), or Mapei, 4:1 bag mix with Planicrete AC Additive or lift thicknesses up to 1/2". Wall render is made to a plastic consistency when used vertically. Apply scratch coat to properly prepared substrate, scratch mortar surface and allow to harden. Apply subsequent "float coat" lifts to hardened, clean and well bonded scratch coated surfaces. Fill all holes and bring surface up to line and plane as required. As manufactured by Laticrete International, Mapei, Inc. or approved equal. Note that slurry bond coats are not required under vertical applications of the render and scratch coat. (Refer to Course Length Tolerances for competitive pools.)

D. Waterproof Membrane

1. Waterproofing shall be a modified rubber latex system intended specifically for the application. It shall be part of a compatible finish system from the surface of the concrete to the tile grout / plaster finish, be of one approved manufacturer and warranted by them. Waterproofing shall extend uniformly from coping to coping, without gaps or holidays, sealed at all fittings and penetrations, over which shall be applied tile swimming pool finishes as required.
2. Over thick bed mortar / render and/or scratch coat apply Laticrete's HydroBan or Mapei's Mapelastc Aquadefense single component, self curing liquid rubber polymer waterproofing membrane. Apply to twenty mils thick minimum, without gaps, holes or holidays and three coats with reinforcing fabric over properly prepared corners, cracks and joints. Carefully seal at all pipe and equipment penetrations. Refer to drawings for additional information. As manufactured by Laticrete International, Mapei, Inc. or approved equal.

E. Elastomeric Sealant

1. Use Laticrete Latasil sealant for all inside/outside corners, expansion/movement joints, and to seal lighting/plumbing fixture penetrations. Apply sealant over Latasil 9118 primer. All primer and sealant installation shall be in accordance with the manufacturer's requirements. As manufactured by Laticrete International, Inc., or approved equal.

- F. All mixing and application procedures shall be done in accordance with the manufacturer's recommendations and requirements. The manufacturer's representative shall visit the site to verify field conditions, confirm materials and application requirements and ascertain that all materials and systems are so installed. Documentation shall be provided to this effect.
- G. Tile Thin-Set
 - 1. Use either Laticrete 254 Platinum one-step, polymer fortified, thin-set mortar or Mapei Ultraflex 3 one-step, polymer modified, thin-set mortar, used in accordance with the manufacturer's requirements. As manufactured by Laticrete International, Mapei, Inc., or approved equal.
- H. Tile Grout
 - 1. Use either Laticrete PermaColor Grout or Mapei Ultracolor Plus Grout in accordance with the manufacturer's requirements. As manufactured by Laticrete International, Mapei, Inc., or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

- A. Complete water tightness test prior to tile installation. Concrete tank shall be watertight per ASTM D5957, the Tile Council of North America, and specification 131100.
- B. Clean substrates of dust, dirt, oil, grease and deleterious substances and mechanically roughen concrete and shotcrete for bond. Conform to applicable reference standards and to recommendations of manufacturers of materials used and meeting ICRI, CSP of 2-3.
- C. Substrates to Receive Mortar Setting Beds
 - 1. Dampen concrete substrate to receive tile work according to above referenced standards or tile manufacturer's instructions, as required.
- D. Substrates to receive thin set tile applications shall meet normal construction tolerances of 1/4" in 10' where competition tolerances do not apply, and shall meet competition tolerances where required elsewhere in these specifications, and shall be free of bumps, dips and surface irregularities that may effect the satisfactory installation of the tile.
- E. Tile Wetting
 - 1. Dampen tile according to above reference standards or tile manufacturer's instructions, as required.
- F. Screeds
 - 1. Accurately set temporary screeds to control the finish plane of mortar-bed set tile and remove as soon as setting bed is sufficiently hardened. Fill void spaces from screeds with same mortar.

3.02 TILE INSTALLATION

- A. Arrange tile according to patterns detailed. Set tile with flush well-fitted joints, finished in true planes, plumb, square, joints of uniform size. Provide approved trimmers as shown or required. Cut tile without marring. Carefully grind and joint tile edges and cuts.
- B. Follow Tile Council of North America installation methods P601 and B417 to achieve total tile system thickness for thin or thick-set.
 - 1. Thin Set

- a. Apply specified bond coat on cured and dried concrete pool shell. Trowel 3/32" to 1/8" thick bond coat over concrete pool shell just before setting tile or apply bond coat to back of each tile placed. 95% coverage of the back of the tile or tile sheet is required. Set tile in position and beat firmly into the setting bed mortar. Bring tile faces to a true and correct plane. Complete all beating and leveling before mortar sets and in no case later than one hour after first placing. When ready, wet and remove paper and glue avoiding excess water. At this time adjust any out-of-line or out-of-level tile.
- C. Finished tile surface shall be level and in plane, with no sharp or protruding edges. Tiles out of plane more than 1/16" shall be removed and replaced. Sharp edges shall be stoned smooth.
- D. Grout Joint Sizes
 1. Unless otherwise approved, install tile with uniform 3/32 inch joint width. A maximum 1/8" joint width may be utilized to meet specific installation requirements, if required.
- E. Ceramic Tile Joint Grouting
 1. Mix grout to a thick creamy consistency and force into joints for entire thick depth, flush with surface. Clean off all excess and fill skips and gaps before grout sets. Color selection by Architect or Interior Designer. Provide dampness for minimum 3-day curing and polish with clean dry cloths (not required when epoxy grouts are used).
- F. Expansion Joints
 1. Place expansion joint per applicable TCNA Method P601MB, P601TB, or P602 and conforming to Method EJ171. Provide shop drawings showing backer rod and joint dimensions. All expansion, control, construction, cold, and seismic joints in the pool structure should continue through the tile work, including such joints at vertical surfaces. Movement joints shall be placed at all changes in direction and elevation. Refer to the structural engineer for additional required movement joints. Joint size shall be a minimum of 1/8". Joints through tile work directly over structural joints shall not be narrower than the structural joint. The Contractor shall use cement compatible coatings when using chalk lines for joint layout purposes.
- G. Fill and Empty Rates
 1. Use a fill and drain rate of 2 feet per 24 hours to minimize thermal shock and structural movement. Maintain a temperature differential of 10 degrees Fahrenheit or less between the pool water and the substrate during fill and drain cycles.

3.03 TESTING AND INSPECTION

- A. Before filling of the pool, and its subsequent provisional acceptance at substantial completion, the tile installation shall be visually inspected and sounded in the presence of the Architects and/or the Owner's representative to verify adhesion of the tile to its substrate as well as its overall compliance with the requirements of this Section.
- B. Any and all tile work found to be loose, improperly adhered, out of plane, misaligned or otherwise non-conforming shall be removed and replaced at no additional cost to the Owner.
- C. Monitor the pH level of the substrate prior to laying tile. Do not install tile until the pH has a value less than 10. Properly balance the pool water immediately upon fill.
- D. At the conclusion of all surface preparation and prior to the installation of tile, measure the relative humidity of the slab. The relative humidity shall not exceed 75%.

- E. At the conclusion of all surface preparation and prior to the installation of the tile, measure the moisture vapor emissions rate (MVER) with a calcium chloride test (ASTM F-1869). The MVER shall be less than 5 lbs per 1000 SF in 24 hours.

3.04 CLEANING

- A. Upon completion of placement and grouting, clean tile installation as recommended by TCNA and manufacturers of proprietary materials. Tile shall be cleaned with pH neutral solutions, free of both sodium and potassium, in accordance with the tile and grout manufacturer's printed instruction.
- B. Leave finished installation clean and free of cracked, chipped, broken, un-bonded or otherwise defective tile work.
- C. Protect installed tile work with non-staining Kraft paper, polyethylene sheeting, or other approved heavy covering during the construction period to prevent damage.

3.05 REPLACEMENT TILE

- A. Provide Owner with approximately 10% or 25 square feet (whichever is least) of each color and type tile used on the project for Owner's repair and replacement requirements.

END OF SECTION

SECTION 13 3416.53 - PORTABLE BLEACHERS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes: Portable Closed Deck Bleacher Seating includes, multiple-tiered seating rows of seats, deck components, understructure that permits raising or lowering (Tip & Roll) without requiring dismantling, into a used mobile or stored configuration. .
- B. Typical applications include the following:
 - 1. Multiple portable bleacher seating sections used concurrently. (A seating bank)
- C. Special applications include the following:
 - 1. To be used on gymnasium resilient floor
- D. Qualifications and Capabilities:
 - 1. **BIDDER QUALIFICATIONS:** Bidders are required to be an authorized dealer or manufacturer for equipment proposed which on a day-to-day basis regularly provide the equipment offered. Bidders are further advised that only standard production models or standard options will be acceptable for award. Equipment offered shall be currently manufactured on an active assembly line.
 - 2. **SERVICE CAPABILITY:** The Bleacher Contractor must be able to show proof of full time service capability by factory certified technicians directly employed by the Bleacher Contractor. Sub-Contractors of the Bleacher Contractor or Factory Technicians located outside of the State do not qualify under this service response requirement. Adequate and satisfactory availability of repair parts and supplies, and ability to meet warranty and service requirements are a requirement of this Invitation to Bid. A four (4) to eight (8) hour maximum on-site repair response is required during normal working hours, 8 a.m. to 5 p.m. weekdays (excluding holidays) All Full Time Service Personnel shall be Factory Authorized and Trained.

1.02 REFERENCE

- A. Michigan Building Code (MBC)
- B. ICC 300 – Standard for Bleachers, Folding and Telescopic Seating and Grandstands
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017
- D. NFPA 102 - Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures 2016.
- E. AA - Aluminum Structures, Construction Manual Series.
- F. ASTM - Standard Specification for Properties of Materials.
- G. NFoPA - National Design Specification for Wood Construction.
- H. SPIB - Standard Grading Rules for Southern Pine.
- I. PS1 - Construction and Industrial Plywood.
- J. ADA - Standards for Accessible Design 2010.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015, with Errata (2016).
- L. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel 2018.

1.03 MANUFACTURER'S SYSTEM ENGINEERING DESCRIPTION

- A. Structural Performance: Engineer, fabricate and install portable bleacher gym seating systems to the following structural loads without exceeding allowable design working stresses of materials involved, including anchors and connections. Apply each load to produce maximum stress in each respective component of each gym seat unit.
 - 1. Design Loads: Comply with ICC 300 – 2012 Edition
- B. Manufacturer's System Design Criteria:

1. Gymnasium seat assembly; Design to support and resist, in addition to its own weight, the following forces:
 2. Live load of 120 lbs per linear foot [162.69 N/m] on seats and decking
 3. Uniformly distributed live load of not less than 100 lbs per sq. ft. [135.58N/m] of gross horizontal projection.
 4. Parallel sway load of 24 lbs. [32.53 N/m] per linear foot of row combined with (b.) above
 5. Perpendicular sway load of 10 lbs. [13.56 N-m] per linear foot of row combined with (b.) above
- C. Member Sizes and Connections: Design criteria (current edition) of the following shall be the basis for calculation of member sizes and connections:
1. Specification for Aluminum Structures
 2. NFOPA: National Design Guide For Wood Construction.

1.04 SUBMITTALS

- A. Project Data: Manufacturer's product data for each system.
 1. Deviations: List of deviations from these project specifications, if any.
- B. Shop Drawings: Indicate Portable Bleacher Seat assembly layout. Show seat heights, row spacing and rise, and locations, assembly dimensions, material types and finishes..
- C. Samples: Seat materials and color finish as selected by Architect from manufacturers standard offered color finishes.
- D. Manufacturer Qualifications: Certification of insurance coverage and manufacturing experience of manufacturer,
- E. Installer Qualifications: Installer qualifications indicating capability, experience, and official Certification Card issued by manufacturer of bleacher seating.
- F. Engineer Qualifications: Certification by a professional engineer registered in the state of manufacturer that the equipment to be supplied meets or exceeds the design criteria of this specification.
- G. Operating/Maintenance Manuals: Provide to Owner maintenance manuals. Demonstrate operating procedures, recommended maintenance and inspection program.
- H. Warranty: Manufacturers standard warranty documents.

1.05 QUALITY ASSURANCE

- A. Seating Layout: Comply with ICCA 300 -2012 Standard for Bleachers, Folding Telescopic Seating and Grandstands, except where additional requirements are indicated or imposed by authorities having jurisdiction.
- B. Manufacturer Qualifications: Manufacturer who has a minimum of 40 years of experience manufacturing telescoping gym seats and Portable bleachers can demonstrate continual design enhancement and 25-year minimum product life-cycle support of seating.
- C. Installer Qualifications: Engage experienced Installer who has specialized in installation of telescoping gym seat types similar to types required for this project and who carries an official Certification Card issued by telescoping gym seat manufacturer.
- D. Engineer Qualifications: Engage licensed professional engineer experienced in providing engineering services of the kind indicated that have resulted in the successful installation of telescoping bleachers similar in material, design, fabrication, and extent to those types indicated for this project.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver product fully assembled or Select Field Assembly.
- B. Deliver portable bleacher seats in manufacturers packaging clearly labeled with manufacturer name and content.

- C. Handle seating equipment in a manner to prevent damage.
- D. Deliver the seating at a scheduled time for installation that will not interfere with other trades operating in the building.

1.07 **PROJECT CONDITIONS**

- A. Field Measurements: Coordinate actual dimensions of construction affecting portable bleachers installation by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid delay of Work.

1.08 **WARRANTY**

- A. Manufacturer's Product Warranty: Submit manufacturer's standard warranty form for telescoping bleachers. This warranty is in addition to, and not a limitation of other rights Owner may have under Contract Documents.
 - 1. Warranty Period: Five years from Date of Acceptance.

1.09 **MAINTENANCE AND OPERATION**

- A. Instructions: Both operation and maintenance shall be transmitted to the Owner by the manufacturer of the seating or his representative.

PART 2 – PRODUCTS

2.01 **MANUFACTURERS**

- A. Basis of Design: Hussey Seating Company, U.S.A, MAXAM1 Portable Bleacher Seating System with CourtSide XC10 Seat Module.
 - 1. Provide either the named product or a comparable product by another manufacturer that is in compliance with these specifications.
- B. Tip & Roll, 3 tier, 5 ½ inc [140mm] rise, fixed 25 inch [559mm] row spacing and a total section width of 7'-6" [2286mm].
- C. Dimensional Data: In-Use: 7'-6" [2286mm] wide x 5'-1 ¾" [1569mm] deep x 2'-5 5/8" [753mm] high
- D. Moving & Storage:
 - 1. 5'-1 ¾" [1569mm] Tall x 2'-5 5/8" [753mm] wide x 7'-6" [2286mm] long
 - 2. Total Weight 245 lbs. [111kg]
- E. Seating Capacity: 15 Person.
- F. Seat color finish: As selected by Architect from manufacturers standard colors.

2.02 **FRAME SYSTEM:**

- A. Two Aluminum Vertical Frames per section with integrated Traction Arm and Gas Struts for assisted lifting and lowering of the seating system by one person.
- B. Lower Track: Structural Aluminum, tubular shape with non-marring Rubber Floor Pads
- C. Vertical Columns: Structural Aluminum, tubular shape.
- D. Deck & Seat Support: Structural High Hat Shape Securely captures front and rear edge of decking at rear edge of nose beam and lower edge of riser beam for entire length of section. While providing mounting location for seat seating system

2.03 **DECK SYSTEM:**

- A. Section Lengths: Each bank shall contain sections not to exceed 7'-6" [2286mm] in length with a minimum of two supporting frames per row, each section.
- B. Combination Nose beam and Rear Riser beam: Beam shall be continuously formed aluminum seating support
- C. Attachment: Through-Bolted fore/aft to frame cantilevers.

- D. Decking: 5/8" [16], AC grade clear-top-coated tongue and groove Southern Yellow Pine; or BC grade polyethylene-top-coated tongue and groove Douglas Fir plywood; both of interior type with exterior glue, 5-ply, all plies with plugged cross-bands, produced in accordance with National Bureau of Standards PS-1-97. Plywood shall be cut and installed with top, center and bottom ply grain-oriented from front of deck to rear of deck (nose beam to riser beam). Adjacent pieces shall be locked together with tongue and groove joint from front to rear of deck.
- E. Longest unsupported span: 21 1/2" [546mm].

2.04 SEAT FABRICATION

- A. Polymer Seat System
 - 1. Seat Modules: 18" [457mm] long assembled, gas assisted injection-molded, high density, 100% recyclable HDPE (high density polyethylene) modules in monochromatic colors providing, dual textured scuff resistant 10" [254mm] deep seat surface with 1/2" [13] minimum interlock on seat and face. Unit structural tested to 600 lbs occupant load.
 - 2. Ergonomically contoured forward "waterfall" edge
 - 3. Integrally molded end caps at aisle end locations
 - 4. Integrally molded rear closure panel at back of seat
 - 5. Seat Attachment:
 - a. Each polymer seat module shall be securely anchored by a 12 ga steel clamp bracket that provides steel-to-steel, through bolted attachment to the front nose beam of the bleacher.

2.05 SHOP FINISHES

- A. Understructure: For rust resistance, steel understructure shall be finished on all surfaces with black "Dura-Coat" enamel. Understructure finish shall contain a silicone additive to improve scratch resistance of finish.
- B. Wear Surfaces: Surface subject to normal wear by spectators shall have a finish that does not wear to show different color underneath:
 - 1. Decking shall have use-surfaces to receive both a sealer coat and wear-resistant high gloss clear urethane finish.
- C. Injection Molded Courtside seats shall be per manufacturer standard colors.

2.06 FASTENINGS

- A. Structural Connections: Secured by structural bolts with prevailing torque lock nuts, free-spinning nuts in combination with lock washers, or Riv-nuts in combination with lock washers.

2.07 TRANSPORT SYSTEMS

- A. Integral Dollies: Provide four non-directional swivel casters with non-marring surface for transportation of seating systems and storage. 360 degree swiveling "kingpinless" casters to insure ease of telescopic section movement. Wheel treads shall be molded polyurethane bonded to cast iron with roller bearing hubs.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. General: Manufacturer's Certified Installers to install gym seats in accordance with manufacturer's installation instructions and final shop drawings. Provide accessories, anchors, fasteners, inserts and other items for installation of portable gym seats
- B. Comply with Portable Closed Deck Bleacher Seating manufacturer's recommendations for product installation requirements.

3.02 ADJUSTMENT AND CLEANING

- A. Adjustment: After installation completion, test and adjust each Portable Closed Deck Bleacher Seating assembly to operate in compliance with manufacturer's operations manual.
- B. Cleaning: Clean installed Portable Closed Deck Bleacher Seating on both exposed and semi-exposed surfaces. Touch-up finishes restoring damage or soiled surfaces.

3.03 PROTECTION

- A. General: Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer to ensure telescoping gym seats are without damage or deterioration at time of substantial completion.

END OF SECTION

TMP Architecture, Inc.
Mitchell and Mouat Architects

TMP19040
MaMA1909

05/27/2020 FOR CONSTRUCTION
BID PACKAGE 3

PORTABLE BLEACHERS
13 3416.53-6