BALTIMORE CITY PUBLIC SCHOOLS

HOLABIRD ELEMENTARY AND MIDDLE SCHOOL

BALTIMORE, MARYLAND

BALTIMORE CITY PUBLIC SCHOOLS

BID SET

VOLUME 1 OF 2 DIVISIONS 0 - 14

March 13, 2017



11720 Beltsville Drive, Suite #600 Calverton, Maryland 20705

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PART 1 GENERAL

1.1 PROJECT

- A. Project Name: Holabird Elementary/Middle School.
- B. Owner's Name: Baltimore City Public Schools.
- C. The Project consists of the construction of a new approximately 89,400SF two (2) story replacement K-8 School and the demolition of an existing two(2) story school building of approximately 48,636SF. The main body of the structure will consist of a structural steel frame. Exterior wall construction of the new facility will be Insulated Concrete Forms with brick veneer. Interior walls will be cmu and metal stud construction. The school is designed to achieve a minimum LEED for Schools Silver rating and will be Net Zero Energy ready.

1.2 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in the Agreement.

1.3 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.4 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.

1.5 COORDINATION

- A. Web-based Project Management Software:
 - 1. RFIs, project submittals and contractor change proposals will be submitted, managed and responded to through a web-based solution for construction administration.
 - 2. The Owner and Architect have selected Newforma Project Cloud as the web-based solution for this Project. Refer to www.newformaprojectcloud.com for additional information on the service.
 - 3. Newforma will provide a training session via web conference.
 - 4. Additional PDF mark-up software may be required for electronic processing.
 - 5. The service fees to be included within Base Bid.
 - 6. Newforma Project Cloud Contact: Dan Taschereau; Tel. 603-440-3908; dtaschereau@newforma.com.
 - 7. Provide a project record CD or DVD containing all data managed through the web-based project management software, at the conclusion of the Project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.2 SCHEDULE OF VALUES

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- B. Forms filled out by hand will not be accepted.
- C. Submit a printed schedule on AIA Form G703 Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.
- D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization and bonds and insurance.
 - 1. Identify site mobilization and bonds and insurance.
 - 2. Include additional line items identified by subsection titles, for Work exceeding \$15,000.
- F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.3 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Present required information in typewritten form.
- E. Form: AIA G702 Application and Certificate for Payment and AIA G703 Continuation Sheet including continuation sheets when required.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- I. Submit three copies of each Application for Payment.
- J. Include the following with the application:
 - 1. Transmittal letter as specified for Submittals in Section 01 30 00.
 - 2. Construction progress schedule, revised and current as specified in Section 01 32 16.
 - 3. Current construction photographs specified in Section 01 30 00.

- 4. Partial release of liens from major Subcontractors and vendors.
- 5. LEED submittals applicable to work for which application is being made; see Section 01 35 16.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- L. Clearly indicate on the Application for Payment those line items which include materials or equipment, purchased or fabricated and stored, but not yet installed.
 - 1. Differentiate between items stored on-site and items stored off-site.
 - 2. Payments for material and equipment stored off-site will be at the sole discretion of the Owner. If required, Contractor will be responsible for all costs of travel and lodging for Architect, Engineers, and Owner to off-site storage locations to examine these items and the conditions of storage.
 - 3. For items stored off-site, provide a bill of sale from supplier/Trade Contractors and certificates of insurance for the full value of stored materials with the Owner named as the insured
 - 4. For items stored off-site show a separate line item for the value of delivering and unloading the items at the Project site.
 - 5. For items stored on or off-site, provide in a separate line item for the value of the installation of these items.
- M. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Staff names and assignments.
 - 3. Schedule of Values.
 - 4. Contractor's Construction Schedule (preliminary if not final).
 - 5. Products list.
 - 6. Schedule of unit prices.
 - 7. Submittals Schedule (preliminary if not final).
 - 8. Copies of building permits.
 - 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 10. Initial progress report.
 - 11. Certificates of insurance and insurance policies.
 - 12. Performance and payment bonds.
 - 13. Data needed to acquire Owner's insurance.
- N. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

1.4 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.

- B. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710.
- C. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 7 days.
- E. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 - 4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

J. Promptly enter changes in Project Record Documents.

1.5 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01 70 00, Section 01 77 00 and Section 01 78 00.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 - 6. AIA Document G707, "Consent of Surety to Final Payment."
 - 7. Evidence that claims have been settled.
 - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - 9. Final, liquidated damages settlement statement.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 21 00 - ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances.
- B. Quantity allowances.
- C. Payment and modification procedures relating to allowances.

1.2 RELATED REQUIREMENTS

A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts, less cost of delivery to site, less applicable taxes.
- B. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.
- C. Architect Responsibilities:
 - 1. Select products in consultation with Owner and transmit decision to Contractor.
 - 2. Prepare Change Order.
- D. Contractor Responsibilities:
 - 1. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 2. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 3. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- E. Differences in costs will be adjusted by Change Order.

1.4 OUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or as described in the Allowance, in the specified quantity.
- B. Costs Included in Quantity Allowances: Cost of components or equipment to Contractor or subcontractor, less applicable trade discounts, including cost of delivery to site and applicable taxes.
- C. Where specifically indicated, include in the allowance the labor required to install products, materials, and equipment provided under the allowance. Note: By definition, statements requiring the Contractor to 'provide' a quantity of work includes labor.
 - 1. Allowances including labor to also include Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, uncrating and storage, protection from the elements and damage, and similar costs related to products and materials.
 - 2. Differences in quantities used will be adjusted by Change Order on an unit cost basis.
- D. Where labor is not specifically indicated to be included within the quantity allowance, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, uncrating and storage, protection from the elements and damage, and similar costs

related to products and materials ordered by Owner under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.5 ALLOWANCES SCHEDULE

- A. Allowance No. 1: Curriculum Integration System/Energy Dashboard
 - 1. Provide an Allowance for Curriculum Integration System/Energy Dashboard, include the stipulated sum of \$______: Basis of Design: CMTA Sphere to include consultant design services, computer graphic designed system, BAS controls integration, and computer integration with owner's network system and 5 years of maintenance.
- B. Allowance No. 2: Project Signage.
 - 1. Section 10 14 00 Signage: Include the stipulated sum of \$_____ for installation of Project Signage.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 22 00 - UNIT PRICES

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 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.

1.3 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.

14 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.

1.5 SCHEDULE OF UNIT PRICES

- A. Unit Price 1: Removal of unsatisfactory soil and replacement with engineered fill material.
 - Description: Removal of unsatisfactory soil excavation and disposal off site and replacement with engineered fill from off site, as required, according to Section 31 10 00 "Earth Moving."
 - 2. Unit of Measurement: Cubic yard of soil excavated, based on survey of volume removed.
 - 3. Quantity to be included in Base Bid: 200 cubic yards.
- B. Unit Price 2: Removal of unsatisfactory soil and replacement with satisfactory soil material.
 - 1. Description: Removal of unsatisfactory soil excavation and disposal off site and replacement with borrow/satisfactory soil from off site, as required, according to Section 31 20 00 "Earth Moving."
 - 2. Unit of Measurement: Cubic yard of soil excavated, based on survey of volume removed.
 - 3. Quantity to be included in Base Bid: 400 cubic yards.
- C. Unit Price 3: Sheeting and shoring for protection of excavation.
 - 1. Description: Erection and maintenance of Sheeting and shoring as specified in Section 31 50 00; removal at completion of use.
 - 2. Unit of Measurement: Square feet.
 - 3. Quantity to be included in Base Bid: None.
- D. Unit Price 4: 6" nominal CMU wall.
 - 1. Description: Erection of interior 6" CMU walls as specified in Section 04 20 00.
 - 2. Unit of Measurement: Square feet.
 - 3. Quantity to be included in Base Bid: 200 square feet.

- E. Unit Price 5: 4" nominal CMU wall.
 - 1. Description: Erection of interior 4" CMU walls as specified in Section 04 20 00.
 - 2. Unit of Measurement: Square feet.
 - 3. Quantity to be included in Base Bid: 200 square feet.
- F. Unit Price 6: Partition type J1 metal stud gypsum wall.
 - 1. Description: Erection of interior partition type J1 walls as specified in Section 09 21 16 and 9 22 16.
 - 2. Unit of Measurement: Square feet.
 - 3. Quantity to be included in Base Bid: 200 square feet.
- G. Unit Price 7: Partition Type X1 metal stud gypsum wall.
 - 1. Description: Erection of interior partition type X1 walls as specified in Section 09 21 16 and 9 22 16.
 - 2. Unit of Measurement: Square feet.
 - 3. Quantity to be included in Base Bid: 200 square feet.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00 - ALTERNATE BIDS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Administrative and procedural requirements for Alternate Bids.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
 - 2. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate. Include costs of related coordination, modification, or adjustment.

1.3 ACCEPTANCE OF ALTERNATE BIDS

- A. Alternate Bids quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternate Bids will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.4 SCHEDULE OF ALTERNATE BIDS

- A. Bid Alternate No. 1: PV entrance canopy
 - 1. Base metal roof with translucent panels as shown on drawings
 - 2. Alternate 1.A Metal roof with partial PV as shown in drawings on sheet A-8.1
 - 3. Alternate 1.B Full PV roof as shown in drawings on sheets A-8.1 and W-1.1A
- B. Bid Alternate No. 2: Rainwater harvesting cistern
 - 1. Base Bid: Downspout to cast iron boot at grade as indicated on the drawings near Stair 3
 - 2. Alternate: Provide rainwater harvesting cistern system for schoolyard garden watering including: rain barrel downspout escutcheon, downspout "Y", diverter, and filter; a Bushman USA SlimLine 130 gal. rain barrel (color: clay) on 30" Wx5'Lx12"H concrete pad, and a Rain Harvesting's Tank Gauge/Water Level Indicator.
- C. Bid Alternate No. 3: Engraved, Etched pigmented Colored site concrete paving with patterns
 - 1. Base Bid: Provide scored concrete paving as shown at building entrance and Outdoor Learning Areas.
 - 2. Alternate: Provide Engraved, etched colored concrete with custom scoring pattern as shown on landscape drawings L-4.00.
- D. Bid Alternate No. 4 Sod
 - 1. Base- seed as per specification section 32 92 00- 2.1
 - 2. Alternate: provide Sod as per alternate specification section 32 92 00-2.2
- E. Bid Alternate No. 5 Wall panels at community entrance at Vestibule V100
 - 1. Base Painted CMU wall
 - 2. Alternate Demountable Graphic wall panel system as shown on drawings
- F. Bid Alternate No. 6 Air Facility Monitoring System Service agreement

- 1. Base 3-year annual service agreement as per specification 23 52 00-2.9
- 2. Alternate -Provide 5-year annual service agreement
- G. Bid alternate No. 7- Lobby ceiling fans
 - 1. Base no fans
 - 2. Alternate provide ceiling fans with associated wiring as shown on drawings A-7.4, E-2.1 and M-1.1.
- H. Bid Alternate No. 8 Gym ceiling fans
 - Base no fans
 - 2. Alternate provide ceiling fans with associated wiring as shown on drawings A-7.4, E-2.1 and M-1.1.
- I. Bid Alternate No. 9 Concrete in lieu of asphalt side walks
 - 1. Base- asphalt sidewalks as shown on landscape drawings
 - 2. Alternate concrete sidewalks in lieu of asphalt sidewalks were indicated on landscape drawings.
- J. Bid Alternate No 10: Additional Landscape trees
 - 1. Base- trees as shown in landscape plans
 - 2. Alternate Additional trees where indicated in landscape plans.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project coordination.
- B. Requests for interpretation (RFI).
- C. Subcontract list.
- D. Staff names and assignments.
- E. Preconstruction meeting.
- F. Progress meetings.
- G. Progress photographs.
- H. Submittals for review, information, and project closeout.
- I. Number of copies of submittals.
- J. Submittal procedures.
- K. Contractor's use of Architect's CAD files.
- L. Delegated design.
- M. Contractor's review.
- N. Architect's action.
- O. Daily construction reports.

1.2 PROJECT COORDINATION

- A. Project Coordinator: General Contractor.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for vehicle and truck access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.

11. Closeout submittals.

1.3 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 - 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
 - 3. Frivolous RFIs: The Contractor will compensate the Owner for the Architect's time and expenses to process RFIs resulting from the Contractor's lack of studying and comparing the Contract Documents, coordinating their own Work, or repeating previous RFIs.
 - 4. Submit RFIs through the Web-based Project Management Software, in PDF format.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Contractor.
 - 4. Name of Architect.
 - 5. RFI number, numbered sequentially.
 - 6. Specification Section number and title and related paragraphs, as appropriate.
 - 7. Drawing number and detail references, as appropriate.
 - 8. Field dimensions and conditions, as appropriate.
 - 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 10. Contractor's signature.
 - 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Format of RFIs: Content provided by CSI Form 13.2.A, as provided at end of this Section.
 - 1. Software-Generated RFIs:
 - a. Preferred format.
 - b. Software-generated form with substantially the same content as indicated above.
 - c. Photographs shall be electronic files in JPG format.
 - d. Attachments shall be electronic files in Adobe Acrobat PDF format.
 - 2. Hard-Copy RFIs:
 - a. Permitted under conditions where electronic RFI is not feasible.
 - b. Identify each page of attachments with the RFI number and sequential page number.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond through the Web-based Project Management Software. Allow seven working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
 - 1. The following RFIs may be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.

- c. Requests for coordination information already indicated in the Contract Documents.
- d. Requests for adjustments in the Contract Time or the Contract Sum.
- e. Requests for interpretation of Architect's actions on submittals.
- f. Incomplete RFIs or RFIs with numerous errors.
- 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
- 3. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, submit Change Order Request within 10 days of receipt of the RFI response as provided by General Conditions of the Contract.
- E. On receipt of Architect's action, immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- F. RFI Log: Prepared and maintained by the Architect within the Web-based Project Management Software; Contractor to maintain a separate RFI log with subcontractors.

1.4 SUBCONTRACT LIST

- A. Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
 - 4. Number of Copies: Submit four copies of subcontractor list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.

1.5 STAFF NAMES AND ASSIGNMENTS

- A. Submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site, prior to or coinciding with initial Application for Payment.
- B. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers.
- C. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
- D. Post copies of list in Project meeting room, in temporary field office, and by each temporary phone.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.

- 2. Submission of executed bonds and insurance certificates.
- 3. Distribution of Contract Documents.
- 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
- 5. Designation of personnel representing the parties to Contract, Owner and Architect.
- 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
- 7. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.2 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals.
- B. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Contractor's project manager and job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:

- 1. Review minutes of previous meetings.
- 2. Review of Work progress.
- 3. Field observations, problems, and decisions.
- 4. Identification of problems that impede, or will impede, planned progress.
- 5. Review of submittals schedule and status of submittals.
- 6. Review of off-site fabrication and delivery schedules.
- 7. Maintenance of progress schedule.
- 8. Corrective measures to regain projected schedules.
- 9. Planned progress during succeeding work period.
- 10. Maintenance of quality and work standards.
- 11. Effect of proposed changes on progress schedule and coordination.
- 12. LEED requirements and documentation progess.
- 13. Other business relating to Work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.3 PROGRESS PHOTOGRAPHS

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Architect.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
 - 1. Excavations in progress.
 - 2. Foundations in progress and upon completion.
 - 3. Structural framing in progress and upon completion.

- 4. Enclosure of building, upon completion.
- 5. Final completion, minimum of ten (10) photos.

E. Views:

- 1. Provide non-aerial photographs from four cardinal views at each specified time, until Date of Substantial Completion.
- 2. Consult with Architect for instructions on views required.
- 3. Provide factual presentation.
- 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1600 by 1200 ("2 megapixel"), in JPG format; provide files unaltered by photo editing software.
 - 1. Delivery Medium: Web-based Project Management Software.
 - 2. File Naming: Include project identification, date and time of view, and view identification.
 - 3. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.
- G. Additional Photographic Requirements: Refer to Section 01 57 21 for photographic documentation requirements for Indoor Air Quality Controls.

3.4 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.
 - 5. LEED submittals and reports.
- B. Package these submittals by specification section, except closeout submittals or Work performed by separate trades, in a single delivery to the Architect; failure of the Contractor to package these submittals in a single delivery may cause the Architect to withhold action on submittal until associated submittals required by the particular specification section are received.
 - 1. LEED Submittal and LEED Report data required by the Contract Documents and the LEED Certification process to be assembled separately from other submittal types and organized as the first items in any package of submittals; do not rely on the Architect or LEED consultant discovering the required data within product data or any other sort of submittal.
- C. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- D. Product data and shop drawings to be submitted and managed through the Web-based Project Management Software.
- E. Samples will be reviewed only for aesthetic, color, or finish selection.
- F. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 CLOSEOUT SUBMITTALS.

3.5 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. Daily construction reports.
- 8. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.
- C. Informational submittals to be submitted and managed through the Web-based Project Management Software.

3.6 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:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.7 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.8 SUBMITTAL PROCEDURES

- A. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- B. Transmit each submittal with a copy of approved submittal form.
- C. Submittals not requested will not be recognized or processed.
- D. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of

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

- Initial Review: Allow 21 days for initial review of each submittal; duration of time is
 defined by date received in Architect's office until the day sent from the Architect's office.
 Allow additional time if coordination with subsequent submittals is required. Architect
 will advise Contractor when a submittal being processed must be delayed for
 coordination.
- 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
- 3. Resubmittal Review: Allow 15 days for review of each resubmittal; duration of time is defined by date received in Architect's office until the day sent from the Architect's office.
- 4. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal; duration of time is defined by date received in consultant's office until the day sent to the Contractor. Submittals required within the following divisions to be sent directly to the Architect's consultants:
 - a. All required submittals indicated in Division 3 section.
 - b. The following required submittals indicated in Division 4:
 - 1) Product data, shop drawings, material certificates, mix designs, and cold-weather procedures.
 - c. All required submittals indicated in the following Division 5 Sections:
 - 1) Structural Steel
 - 2) Steel Joists
 - 3) Steel Decking
 - 4) Cold-Formed Metal Framing
 - 5) Metal Stairs
 - 6) Railings and Handrails
 - 7) Metal Fabrications
 - d. All required submittals indicated in the following Division 8 Section:
 - 1) Door Hardware
 - 2) Curtainwall
 - e. All required submittals for Food Service Equipment.
 - f. All required submittals indicated in Mechanical Divisions 21 through 23 sections.
 - g. All required submittals indicated in Division 26 sections.
 - h. All required submittals indicated in Divisions 31 through 33 sections.
- 5. Color Selection: Architect will select colors within 60 days (to allow time for presentation to Owner and for Owner comments) after all color samples have been submitted including, but not limited to items listed below. The submittal data shall be complete, including shop drawings, product data, and color samples, and all required submittals and materials shall be in compliance with the specifications and be subsequently approved by the Architect. Color samples shall be actual samples of the material and not photographs. If there is a variation in color, shade, texture, or pattern, submit multiple samples to show full range of variation.
 - a. Interior Items (including but not limited to):
 - 1) Plastic laminate and millwork.
 - 2) Wood door veneer.
 - 3) Ceramic tile.
 - 4) Resilient floor tile.

- 5) Resilient wall base and accessories.
- 6) Resinous flooring.
- 7) Carpet.
- 8) Acoustical wall panels.
- 9) Paint.
- 10) High-performance coatings.
- 11) Toilet compartments.
- 12) Signs and cast letters.
- 13) Casework veneer.
- b. Prefinished Exterior Items (including but not limited to):
 - 1) Metal roofing.
 - 2) Copings, perimeter edge systems.
 - 3) Site furnishings and equipment.
- F. Submittal Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06 10 00.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06 10 00.01.A).
 - 2) Number and title of appropriate Specification Section.
 - 3) Drawing number and detail references, as appropriate.
 - 4) Location(s) where product is to be installed, as appropriate.
 - 5) Other necessary identification.
- G. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on submittals.
- H. Resubmittals:
 - 1. Resubmit submittals until they are marked "No Exception Taken" or "Note Markings".
 - 2. Resubmission of items rejected or marked "Revise and Resubmit" will be reviewed one time by the Architect at no cost to the Contractor. Should the re-submittal be rejected or marked "Revise and Resubmit", the Contractor will reimburse the Owner by credit Change Order for all costs to the Owner for additional time spent by the Architect and the Architect's consultants to review the second (and subsequent) resubmission.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Note Markings" taken by Architect.

3.9 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. At Contractor's written request, copies of Architect's CAD Drawing files will be provided to Contractor for Contractor's use in connection with Project; Contractor must sign and return the release form at the end of this Section.
- B. Allow one week for processing, shipping and handling after Architect receives the signed form.
- C. Only the files indicated on Agreement included at the end of this Section shall be made available for use as backgrounds for preparation of shop drawings and coordination drawings. No other CAD Drawing files, for this Project, will be made available.

3.10 DELEGATED DESIGN

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

3.11 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect through the Web-based Project Management Software
- C. Verify:
 - 1. Field Measurements.
 - 2. Field Construction Criteria.
 - 3. Catalog Numbers and Similar Data.
 - 4. Quantities.
- D. Contractor's responsibility regarding errors and omissions in submittals is not relieved by Architect's review of submittals.
- E. Contractor's responsibility regarding deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals, unless Architect gives written acceptance of specific deviations as approved by Owner.
- F. When work is directly related and involves more than one trade, coordinate submittal with other trades and submit under one cover.

- G. After a submittal has been submitted for review, no changes may be made to that Submittal other than changes resulting from review notes made by the Architect unless such changes are clearly identified and circled before being resubmitted. Any failure to comply with this requirement shall nullify and invalidate the Architect's review.
- H. Approval Stamp: Stamp each submittal. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents as indicated below:

THIS IS TO CERTIFY THAT THE SPECIFICATION REQUIREMENTS HAVE BEEN MET AND ALL
DIMENSIONS, CONDITIONS, AND QUANTITIES ARE VERIFIED AS SHOWN AND/OR
CORRECTED ON THESE DRAWINGS.
SIGNED

3.12 ARCHITECT'S/ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it; except where indicated otherwise. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. NO EXCEPTION TAKEN: The Work covered by the submittal is accepted as specified and the Work may proceed provided it complies with requirements of the Contract Documents.
 - 2. NOTE MARKINGS: The Work covered by the submittal is accepted as noted and the Work may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
 - 3. REVISE AND RESUBMIT: Do not proceed with the Work covered by the submittal. Revise or prepare a new submittal according to the notations and requirements of the Contract Documents, and resubmit without delay. Unmarked items may be fabricated if indicated.
 - 4. REJECTED: Architect will list reasons for rejection on the submittal or in the transmittal letter accompanying the submittal. Do not proceed with the Work covered by the submittal. Prepare new submittal according to the notations and requirements of the Contract Documents, and resubmit without delay.
 - 5. ACTION NOT REQUIRED: Either the submittal was not requested or the submittal was for information only or for record purposes.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded

3.13 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report, recording the following information concerning events at the site.
 - 1. List of Trade Contractors at the site.
 - 2. List of major items of equipment on site.
 - 3. List of construction activities performed (for each trade).
 - 4. Approximate count of personnel at the site for each trade.
 - 5. High and low temperatures, general weather conditions.
 - 6. Accidents and unusual events.
 - 7. Meetings and significant decisions.
 - 8. Stoppages, delays, shortages, losses.
 - 9. Meter readings and similar recordings.
 - 10. Emergency procedures.
 - 11. Orders and requests of governing authorities.
 - 12. Change Orders received, implemented.
 - 13. Services connected, disconnected.
 - 14. Equipment or systems tests and start-ups.
 - 15. Partial Completions, occupancies.
- B. Daily construction reports are to be uploaded to the Web-based Project Management Software no more that 7 days after the date of the report.
- C. Duplicate copies of the daily construction reports shall accompany the progress report and be turned over to the Architect at the job conference.

END OF SECTION



REQUEST FOR INTERPRETATION

Project:		From:				
Т.						
Re:						
Specification Section:	Paragraph:	Drawing Reference:	Detail:			
Request:						
Signed by:			Date:			
Response:						
Attachments						
Response From:	То:	Date Rec'd:	Date Ret'd:			
Signed by:			Date:			
Copies: Owner	Consultants					



SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS LIST

Project: To (A/E):									
					A/E Project Nun	ıber:			
List Subcontra	actors and Major Material	Suppliers proposed for us	se on this Project	as required by the					
Section Number	Section Title	Firm		Address			Phone Number (Fax Number)	Contact	
Attachmen	nts								
Signed by:							Date:		
Copies:	Owner Consu	ıltants						_ 🗆	



SUBMITTAL TRANSMITTAL

Project:				
TRANSMITTAL A Qty. Referen	To (Contractor): From (Subcontractor):		Date:By:	<u> </u>
Numbe				Drawing Detail Reference
☐ Complies with c☐ Will be available	review and approval ontract requirements e to meet construction sched included in construction sch		☐ If substitution invo comparative data o	ved - Substitution request attached blved, submission includes point-by-point or preliminary details submission will be ordered receipt of approval One copy retained by sender
TRANSMITTAL B	To (A/E): From (Contractor):		Attn:	Date Rec'd by Contractor: Date Trnsmt'd by Contractor:
Approved Approved as not Other remarks on ab			Revise / Resubmi	
TRANSMITTAL	To (Contractor): From (A/E):			Date Rec'd by A/E: Date Trnsmt'd by A/E:
Approved Approved as not Not subject to re No action requir Revise / Resubm Rejected / Resub Approved as not Other remarks on ab	eview ed nit omit ed / Resubmit		Sepia copies only	mparative data required oval process
TRANSMITTAL D	To (Subcontractor): From (Contractor):	_	Attn: By:	
Copies: Owner	Consultants			One copy retained by sender



ELECTRONIC MODEL RELEASE FORM

Architect: Grimm + Parker Architects

11720 Beltsville Drive

Suite 600

Calverton, MD 20705

Contractor:

Date:

Project No: G+P Project No. 21552.00

Project: Holabird Elementary/Middle School

Software: Version:

File Name	Date Revised	

Contractor shall pay Architect a fee of (\$0)

Terms & Conditions:

- 1. Architect makes no representation as to the compatibility of the Building Information Model (BIM) with any hardware or software.
- 2. Since the information set forth in the BIM can be modified unintentionally or otherwise, the Architect reserves the right to remove all indicia of its ownership and/or involvement from each electronic display.
- 3. All information in the BIM is considered instruments of service of the Architect and shall not be used for other projects, for additions to this project, or completion of this project by others. The BIM shall remain the property of the Architect, and in no case shall be transfer of these files be considered a sale.
- 4. Architect makes no representation regarding the accuracy, completeness, or permanence of the BIM, or for its merchantability or fitness for a particular purpose. Addenda information or revisions made after the date indicated above may not have been incorporated. In the event of a conflict between the Architect's sealed contract drawings and the BIM files, the sealed contract drawings shall govern. It is the Contractor's responsibility to determine if any conflicts exist. The BIM files shall not be considered to be Contract Documents as defined by the General Conditions of the Contract for Construction.
- 5. The use of BIM files prepared by the Architect shall not in any way obviate the Contractor's responsibility of the proper checking and coordination of dimensions, details, member sizes and gauge, and quantities of materials as required to facilitate complete and accurate fabrication and erection.
- 6. The Contractor shall, to the fullest extent permitted by law, indemnify, defend and hold harmless the Architect, and its subconsultants from all claims, damages, losses, expenses, penalties, and liabilities of any kind, including attorney's fees, arising out of or resulting from the use of the BIM files by the Contractor, or by third party recipients of the BIM files from the Contractor.

- 7. The Architect believes that no licensing or copyright fees are due to others on account of the transfer of the BIM files, but to the extent any are, the Contractor will pay the appropriate fees and hold the Architect harmless from such claims.
- 8. Any purchase order number provided by the Contractor is for Contractor's accounting purposes only. Purchase order terms and conditions are void and are not a part of this agreement.
- 9. Payment of the service fee is due upon receipt of the BIM files.
- 10. This agreement shall be governed by the laws of the principal place of business of the Architect.

AUTHORIZED ACCEPTANCE

By Architect	By Contractor
Signature	Signature
Print Name and Title	Print Name and Title
Date	Date

SECTION 01 31 14 - FACILITY SERVICES COORDINATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination documents.

1.2 SUBMITTALS

- A. Submit coordination drawings and schedules prior to submitting shop drawings, product data, and samples.
- B. Areas of Work requiring Coordination Drawings include (but not limited to) mechanical rooms, electrical rooms, equipment rooms, corridors, horizontal exits from duct shafts, cross-overs, penetrations of Insualated Concrete Form wall system, and any other areas where congestion of Work occurs. Complete the requirements for Coordination Drawings as required by schedule of construction activities within 75 days of starting construction operations. Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
 - 1. Content: Project-specific information, drawn accurately to scale.
 - 2. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. The Construction Documents in their original, copies or electronic file form are the Architect's instrument of service and are protected under copyright laws.
 - 3. Include the following information, as applicable:
 - a. Follow routing shown on Contract Drawings 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.
 - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate required installation sequences.
 - d. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 - 4. Number of Copies: Submit digitally via the web-based project management software system.
 - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.
 - 5. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
 - 6. Each trade shall sign and date the Coordination Drawings after the addition of their information.
 - 7. Do not begin fabrication until receipt of completed Coordination Drawings are acknowledged by the each contractor in writing to the Architect.
 - 8. No progress payments will be made for any work affected by coordination drawings until coordination drawings governing that work have been accepted.

9. Any work installed prior to approval of coordination drawings shall be modified or replaced, as necessary, to conform to subsequently-approved construction drawings, at no additional cost to Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 COORDINATION REQUIRED

- A. Coordinate the work listed below:
 - 1. Fire Suppression: Division 21.
 - 2. Plumbing: Division 22.
 - 3. Heating, Ventilating, and Air Conditioning: Division 23.
 - 4. Integrated Automation: Division 25.
 - 5. Electrical: Division 26.
 - 6. Communications: Division 27.
 - 7. Electronic Safety and Security: Division 28.
 - 8. Site Utilities: Division 33.
 - 9. Commissioning requirements throughout the Project Manual.
- B. Coordinate progress schedules, including dates for submittals and for delivery of products.
- C. Conduct meetings among Subcontractors and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.
- D. Participate in progress meetings. Report on progress of work to be adjusted under coordination requirements, and any required changes in schedules. Transmit minutes of meetings and reports to concerned parties.
- E. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
- F. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
- G. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
- H. Make adequate provisions to accommodate items scheduled for later installation.

3.2 COORDINATION DOCUMENTS

- A. Prepare coordination drawings to organize installation of products for efficient use of available space, for proper sequence of installation, and to identify potential conflicts.
 - 1. Priority of Construction Space:
 - a. Coordinate installation of different components to ensure performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
 - b. Following is the Order of Priority of construction space:
 - 1) First: Ductwork.
 - 2) Second: Fire protection piping.
 - 3) Third: Other piping.

4) Fourth: Conduit.

- B. Prepare a master schedule identifying responsibilities for activities that directly relate to this work, including submittals and temporary utilities; organize by specification section.
- C. Identify electrical power characteristics and control wiring required for each item of equipment.
- D. Maintain maximum headroom at all locations without finished ceilings.
- E. Maintain finished ceiling heights as indicated.
- F. Coordinate installations with other trades to prevent conflict with Work of other trades and cooperate in making reasonable modifications in layout as needed.
- G. Where conflicts occur with placement of mechanical and electrical materials as they relate to placement of other building materials, the Architect shall be consulted for assistance in coordination of the available space to accommodate all trades.
- H. Maintain documents for the duration of the work, recording changes due to site instructions, modifications or adjustments.
- I. Any construction delays required to accomplish coordination, approval of submittals or re-submittals, or consequent to coordination work, shall be incurred at no additional cost to Owner; such delays may include, but not be limited to, the following:
 - 1. Time taken for preparation and submission of acceptable coordination drawings, including a reasonable period for Architect's review and approval.
 - 2. Time taken for preparation and approval of acceptable mock-ups.
 - 3. Time taken for modifications and replacements of non-conforming work.

3.3 COORDINATION OF SUBMITTALS

- A. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work. Transmit copies of reviewed documents to Architect.
- B. Check field dimensions and clearances and relationship to available space and anchors.
- C. Check compatibility with equipment and work of other sections, electrical characteristics, and operational control requirements.
- D. Check motor voltages and control characteristics.
- E. Coordinate controls, interlocks, wiring of switches, and relays.
- F. Coordinate wiring and control diagrams.
- G. When changes in the work are made, review their effect on other work.
- H. Verify information and coordinate maintenance of record documents.

3.4 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS

- A. Review proposals and requests for substitution prior to submission to Architect.
- B. Verify compliance with Contract Documents and for compatibility with work of other sections.

3.5 OBSERVATION OF WORK

- A. Observe work for compliance with Contract Documents.
- B. Maintain a list of observed deficiencies and defects; promptly submit.

3.6 EQUIPMENT START-UP

- A. Verify utilities, connections, and controls are complete and equipment is in operable condition as required by Section 01 70 00.
- B. Observe start-up and adjustments, test run, record time and date of start-up, and results.
- C. Observe equipment demonstrations made to Owner; record times and additional information required for operation and maintenance manuals.

3.7 INSPECTION AND ACCEPTANCE OF EQUIPMENT

- A. Prior to inspection, verify that equipment is tested, operational, clean, and ready for operation.
- B. Assist Architect with review. Prepare list of items to be completed and corrected.

SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, with network analysis diagrams and reports.
- C. Responsibility for completion of Work per schedule and preparation of recovery schedules.

1.2 REFERENCES

1.3 SUBMITTALS

- A. Within 15 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- G. Submit under transmittal letter form specified in Section 01 30 00 Administrative Requirements.

1.4 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a preliminary network diagram.

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- C. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

- D. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from Architect, within the Web-based Project Management Software. Indicate decision dates for selection of finishes.
 - 1. The Architect shall maintain the submittal log between the Architect and Contractor through Web-based Project Management Software.
 - 2. Contractor to maintain a submittal log with subcontractors.
- E. Coordinate content with schedule of values specified in Section 01 20 00 Price and Payment Procedures.
- F. Provide legend for symbols and abbreviations used.

3.3 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By amount of float, then in order of early start.

3.4 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5 FLOAT TIME

A. Float is not for the exclusive benefit of either Contractor or Owner.

- B. Manage work according to early start dates, by commencing activities on the early start date (calculated by the latest approved Contract Schedule) or earlier if possible, unless constrained by a bona fide resource limitation.
- C. Owner may reserve and apportion float time according to the needs of the Project.
- D. Actual or projected Owner-caused delays that do not exceed available float time shall not have any effect upon Contractor's adherence to specified time constraints and shall not be a basis for any time extension.
- E. Contractor acknowledges the following:
 - 1. Activity delays shall not automatically result in adjustment of specified time constraints.
 - 2. A Change Order or other Owner action or inaction may not affect existing critical activities or cause non-critical activities to become critical.
 - 3. A Change Order or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the network, thereby not causing any effect on specified time constraints.
- F. Pursuant to the above float sharing requirements, use of float releaded by elimination of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, unreasonably extended activity durations, or imposed dates shall be distributed by Owner to the benefit of Owner and Contractor.
- G. In the event of the Contractor wishes to complete the Work earlier than the time specified therefore:
 - 1. Continue to calculate float based on the Work completion date specified as of Contract execution, by maintaining the specified Work completion date as a "finish-no-later-than" constraint.
 - 2. The completion time for the Work shall be amended by Owner's acceptance of or acquiescence to Contractor's proposed earlier completion date.
 - 3. Contractor shall not, under any circumstances, receive additional compensation for indirect, general, administrative or other forms of overhead costs, for the period between the time of earlier completion proposed by Contractor and the completion time for the Work specified as of NTP.

3.6 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.7 RESPONSIBILTY FOR COMPLETION

A. Take a combination of the following actions, at no additional cost to the Owner, when the progress schedule illustrates that the Contract Substantial Completion date can not be met:

- 1. Increase construction manpower in such quantities and trades to substantially eliminate the backlog of Work.
- 2. Increase the number of work hours per shift, shifts per working day, working days per week, or the amount of construction equipment, or any combination to substantially eliminate the backlog of Work.
- 3. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities.
- B. Recovery Schedule: Prepare a recovery schedule from all trades to accelerate progress, if a milestone is missed, a single duration work activitiy is incomplete for ten work days, or overall work progress is deemed insufficient by the Owner/Architect.
 - 1. A recovery schedule must be initiated by the Contractor, reviewed by effected trade contractors and submitted ten working days after one of the above conditions occurs.
 - 2. Submit recovery schedule in same number of copies as original.
 - 3. Trades must execute means necessary to bring the Project back on schedule using the recovery schedule; accelerated Work and additional overhead necessary to keep the Project on schedule is included in the Contract.
 - 4. Recovery schedule to be double the size of the original diagram, as a minimum, illustrating existing and revised activities alongside original data; revised activities must be easily differentiated from originial schedule.
- C. Failure of the Contractor to comply with requirements of this subsection may be a basis for determination that the Contractor is not prosecuting the Work with such diligence as will ensure completion within the time stipulated; upon such determination, the Owner may take such action deemed appropriate.

3.8 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

SECTION 01 35 14 - LEED FOR SCHOOLS 2009 SCORECARD

PART 1 GENERAL

- 1.1 The attached scorecard indicates each LEED point that the project is to achieve.
 - A. LEED Certification Goal: Platinum 54 Points minimum, points shown on scorecard will achieve Platinum Certification.

1.2 ATTACHMENT

A. The Sheward Partnership, LLC LEED Scorecard.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)





Baltimore City Public Schools Holabird Elementary/Middle School 1500 Imla Street, Baltimore, Maryland 21224 February 7, 2017

	get: LEED Platinum						
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			С	Prereq 1	Construction Activity Pollution Prevention	Required	
			D	Prereq 2	Environmental Site Assessment	Required	
1			D	Credit 1	Site Selection	1	
4			D	Credit 2	Development Density and Community Connectivity	4	
1			D	Credit 3	Brownfield Redevelopment	1	
4	1		D	Credit 4.1	Alternative Transportation, Public Transportation and Pedestrian Access	4	
1			D	Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1	
2			D	Credit 4.3	Alternative Transportation, Dicycle Storage & Changing Rooms Alternative Transportation, Low-Emitting and Fuel Efficient Vehicles	2	
2			D	Credit 4.4	Alternative Transportation, Parking Capacity	2	
		1	С	Credit 5.1	Site Development, Protect or Restore Habitat	1	
1			D	Credit 5.2	Site Development, Maximize Open Space	1	
1	_		D	Credit 6.1	Stormwater Management, Quantity Control	1	
1	_		D	Credit 6.2	Stormwater Management, Quality Control	1	
	1		С	Credit 7.1	Heat Island Effect, Non-Roof	1	
1			D	Credit 7.2	Heat Island Effect, Roof	1	
1	4	-	D	Credit 8	Light Pollution Reduction	1	
		1	D D	Credit 9 Credit 10	Site Master Plan Joint Use of Facilities	1	
			טו	Credit 10	JOHN USE OF FACILITIES	<u> </u>	
7	7 2	2		Water Effic	ciency	11 Points	
					,		
			D	Prereq 1	Water Use Reduction, 20% Reduction	Required	
4	1		D	Credit 1	Water Efficient Landscaping	2 to 4	
		2	D	Credit 2	Innovative Wastewater Technologies	2	
2	2 2		D	Credit 3	Water Use Reduction	2 to 4	
					30% Reduction	2	
					35% Reduction 40% Reduction	3 4	
- 1			D	Credit 4	Process Water Use Reduction, 20% Reduction	1	
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			C	Prereq 1	Fundamental Commissioning of the Building Energy Systems	Required	
			D	Prereq 2	Minimum Energy Performance	Required	
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	Credit Type	Credit ID	Credit Description								
varde	-,,,-										
7 0 6		Materials 8	Resources	13 Points							
2	D C	Prereq 1 Credit 1.1	Storage & Collection of Recyclables Building Reuse	Required 1 to 2							
			Maintain 75% of Existing Walls, Floors & Roof	1							
1	С	Credit 1.2	Maintain 95% of Existing Walls, Floors & Roof Building Reuse , Maintain Interior Nonstructural Elements	2 1							
2	С	Credit 2	Construction Waste Management	1 to 2							
			Divert 50% Divert 75%	1 2							
2	С	Credit 3	Materials Reuse	1 to 2							
			Specify 5% Specify 10%	1 2							
2	С	Credit 4	Recycled Content	1 to 2							
			Specify 10% Specify 20%	1 2							
2	С	Credit 5	Regional Materials 10% Extracted, Processed & Manuf. Regionally	1 to 2							
			20% Extracted, Processed & Manuf. Regionally	2							
1	C	Credit 6	Rapidly Renewable Materials, Specify 2.5%	1							
		Credit 7	Certified Wood, Specify 50% FSC Certified	19 Points							
11 2 8	2 8 Indoor Environmental Quality										
	D	Prereq 1	Minimum IAQ Performance	Required							
	D D	Prereq 2 Prereq 3	Environmental Tobacco Smoke (ETS) Control Minimum Acoustical Performance	Required Required							
1	D	Credit 1	Outdoor Air Delivery Monitoring	1 Required							
1	D	Credit 2	Increased Ventilation	1							
1	C	Credit 3.1 Credit 3.2	Construction IAQ Management Plan, During Construction Construction IAQ Management Plan, Before Occupancy	1							
1	Č	Credit 4.1	Low-Emitting Materials, Adhesives & Sealants (4 points available for 6 potential strategies credits 4.1 to 4.6)	1*							
1	С	Credit 4.2	Low-Emitting Materials, Paints & Coatings	1*							
1	С	Credit 4.3	Low-Emitting Materials, Flooring Systems	1*							
1 1	C	Credit 4.4 Credit 4.5	Low-Emitting Materials, Composite Wood & Agrifiber Products Low-Emitting Materials, Furniture & Furnishings	1* 1*							
1	С	Credit 4.6	Low-Emitting Materials, Ceiling and Wall Systems	1*							
1	D	Credit 5	Indoor Chemical & Pollutant Source Control								
1 1	D D	Credit 6.1 Credit 6.2	Controllability of Systems, Lighting Controllability of Systems, Thermal Comfort	1							
1	D	Credit 7.1	Indoor Environmental Comfort, Design	1							
1	D	Credit 7.2	Indoor Environmental Comfort, Verification	1							
1 2	D	Credit 8.1	Daylight & Views	1 to 3							
			Daylight 75% of all Classroom & Core Learning Spaces Daylight 90% of all Classroom & Core Learning Spaces	1 2							
		_	Daylight 75% of all Other Regularly Occupied Spaces	1							
1	D D	Credit 8.2 Credit 9	Daylight & Views, Views for 90% of Regularly Occupied Spaces Enhanced Acoustical Performance	1							
1	D	Credit 10	Mold Prevention	1							
6 0 0		Innovation	& Design Process	6 Points							
	_		·								
1	D D	Credit 1.1 Credit 1.2	Green Housekeeping Green Cleaning - Integrated Pest Management	1							
1	D	Credit 1.3	Green Building Education	1							
1 1	D D	Credit 1.4 Credit 2	PBT Source Reduction: Mercury LEED™ Accredited Professional	1							
1	D	Credit 3	The School As A Teaching Tool	1							
1		Credit 3	The School As A Teaching Tool	I							
3 0 3		Regional P	riority (21224)	4 Points							
1	D	Credit 1.1	SSc5.1: Site Development- Protect and Restore Habitat	1							
1 1	D D	Credit 1.2 Credit 1.3	SSc6.1: Stormwater Design- Quantity Control WEc2: Innovative Wastewater Technologies	1							
1	D	Credit 1.4	EAc1: Optimize Energy Performance 40%	1							
1 1	D D	Credit 1.5	EAc2: On-Site Renewable Energy- 13% MRc1.1: Building Reuse- Maintain existing walls, floors and roof	1							
	U	Credit 1.6									
83 10 21			tals (pre-certification estimates)	110 Points							
		Gertified 40	0-49 points Silver 50-59 points Gold 60-79 points Platinum 80 points and above								

SECTION 01 35 15 - SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT GOALS

- A. This project has been designed to achieve the LEED Silver (minimum 50 points) rating as defined in the LEED(r) Green Building Rating System(tm) for Schools, 2009 Edition.
- B. Contractor is not responsible for the application for LEED certification, nor for determination of methods of achieving LEED credits unless specifically so indicated.
- C. Many of the LEED credits can be achieved only through intelligent design of the project and are beyond the control of the Contractor. However, certain credits relate to the products and procedures used for construction. Therefore, the full cooperation of the Contractor and subcontractors is essential to achieving final certification.
- D. Contractor shall familiarize himself with the relevant requirements and provide the necessary information and instruction to all subcontractors and installers.
- E. Since Contractor and subcontractors may not be familiar with LEED requirements, this section includes a summary of the products and procedures intended to achieve LEED credits.
 - Some credits are marked PREREQUISITE; these must be achieved regardless of the level of certification; many are dependent on proper performance by Contractor and subcontractors.
 - 2. Other credits involve quantifying percentages by weight and cost; these require careful recordkeeping and reporting by the Contractor.
 - 3. See www.usgbc.org for more information.

1.2 GENERAL

- A. Section Includes: General requirements and procedures for compliance with certain sustainable design rating systems, including but not limited to, Baltimore City Green Building Standards and USGBC LEED prerequisites and credits needed for Project to obtain, at minimum, LEED Silver certification under the LEED for Green Building Design and Construction, Schools 2009 Edition.
- B. This specification section is to be used as a based document, as it contains information for multiple LEED prerequisites and credits, and is to be modified for each individual project. While all prerequisites must be included in every project, not all credits may be applicable for every LEED project. Additional prerequisites and credits needed to obtain the indicated certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract. Other prerequisites and credits needed to obtain certification depend on material selections and may not be specifically identified as sustainable design requirements. Compliance with requirements needed to obtain prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.

1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
 - 1. 01 35 14 LEED for Schools 2009 Scorecard
 - 2. 01 35 17 LEED Submittal Forms
 - 3. 01 57 21 Indoor Air Quality Controls
 - 4. 01 74 19 Construction Waste Management
 - 5. 01 91 13 General Commissioning Requirements

- 6. Baltimore City Public Schools Educational Specifications
- 7. Divisions 03 through 14, 31, 32 Sections for Sustainable Design Requirements specific to the Work of each of those Sections. These requirements may or may not include reference to LEED. The LEED Certification Requirements in this section supersede any conflicting requirements outlined in subsequent Specification Sections for this project.

1.4 DEFINITIONS

- A. Agrifiber Products: Composite panel products derived from agricultural fiber.
- B. Certificates of Chain-of-Custody: Certificates signed by manufacturers certifying that wood used to make products has been tracked through its extraction and fabrication to ensure that it was obtained from forests certified by a specified certification program
- C. Composite Wood: A product consisting of wood fiber or other plant particles bonded together by a resin or binder.
- D. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations. A construction waste management plan is to be provided by the Contractor as defined in Division 01 section Construction Waste Management.
- E. LEED: The Leadership in Energy & Environmental Design green building rating systems developed and adopted by the U.S. Green Building Council (USGBC). The systems certify levels of environmental achievement based on a point and credit scoring system.
- F. LEED Online: USGBC project management tool where projects are registered, tracked, and submitted to USGBC for project certification. Information, resources, and support are made available to registered projects and project team members can upload credit templates, view and submit credit interpretation requests, manage key project details, and view and respond to reviewer comments. (from Mont. Co Spec)
- G. Native or Adapted Vegetation: Native or adapted plants and vegetation are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds.
- H. Post-Consumer Recycled Content: The percentage by weight of constituent materials that have been recovered or otherwise diverted from the solid-waste stream after consumer use.
- I. Pre-Consumer Recycled Content (also known as Post-Industrial Recycled Content): Materials that have been recovered or otherwise diverted from the solid-waste stream during the manufacturing process. Pre-consumer content must be material that would not have otherwise entered the waste stream as per Section 5 of the FTC Act, Part 260 "Guidelines for the Use of Environmental Marketing Claims": www.ftc.gov/bcp/grnrule/guides980427
- J. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are NOT recycled materials.
- K. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.
- L. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock.
- M. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (preconsumer), or after consumer use (post-consumer).

- N. Regionally Extracted, Harvested, or Recovered Materials: Materials that are extracted, harvested, or recovered and manufactured within a radius of 500 miles (800 km) from the Project site.
- O. Regionally Manufactured Materials: Materials that are manufactured within a radius of 500 miles (800 km) from the Project location. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site.
- P. Solar Reflectance Index: Measure of a material's ability to reject solar heat, as shown by a small temperature rise. It is calculated according to ASTM E1980 using material's Emittance and Reflectivity values. Standard black has an SRI of 0 and standard white has an SRI of 100. (from Mont. Co Spec)
- Q. Volatile Organic Compounds (VOCs): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible photochemical reactivity, listed in EPA 40 CFR 51.100(s), are also excluded from this regulatory definition.

1.5 SUBMITTALS

- A. General: Submit LEED submittals required by other specification sections.
 - 1. Provide a Green Building Material Certification Form (GBMC Form) to document LEED building data for all related materials. Attach to the GBMC Form documentation from the manufacturer to verify all LEED data.
 - 2. LEED-related submittal packages must include LEED information with performance, product data and/or shop drawings to be considered a complete submittal package for review.
 - 3. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated sustainable requirements.
 - 4. LEED submittals must be submitted and reviewed simultaneously with material submittal. LEED submittal must be approved before material, product data, etc. submittal can be considered approved.
- B. Materials Value: Provide statement that indicates one of the following two calculations. Exclude mechanical, electrical, plumbing, furniture and furnishings, and specialty items such as elevators and equipment.
 - 1. Default Materials Value: Provide the total hard construction costs according to CSI MasterFormat 2004 Divisions 03-10, 31 (Section 31.60.00 Foundations) and 32 (Sections 32.10.00 Paving, 32.30.33 Site Improvements, and 32.90.00 Planting). Multiply the total hard construction costs by 0.45 to determine the Default Materials Value.
 - 2. Actual Materials Value: Provide a tally of actual material costs, excluding labor and equipment according to CSI MasterFormat 2004 Divisions 03-10, 31 (Section 31.60.00 Foundations) and 32 (Sections 32.10.00 Paving, 32.30.33 Site Improvements, and 32.90.00 Planting). Material costs should account for all taxes and transportation costs incurred by the Contractor but exclude any cost for labor and equipment once the material has been delivered to the site. The sum of these values is the Actual Materials Value.
- C. LEED Action Plans: Prepare and submit for Owner's approval the following documents with the bid documents. The documents must comply with the following format unless the Contractor provides an alternate format to be approved by the Owner. The Owner shall not review the Contractor's first application for payment until they have received and approved all of the LEED Action Plans, with the exception of the Bond reimbursement.

- 1. Sustainable Sites credit 3: Asbestos remediation documentation should be included in the action plan.
- 2. MR credit 2: Construction Waste Management: Provide a Construction Waste Management Plan that complies with Division 01 Section Construction Waste Management. No particular format for the plan is required.
- 3. MR credit 4: Recycled Content: Provide a copy of the MR credit 4 template with all of the information included below. The LEED Action Plan shall confirm that the project shall meet the goal of 20% recycled content by cost.
 - a. Estimated Materials Value (see 1.5 Submittals B. Materials Value).
 - b. List of all proposed materials with recycled content, including material name and manufacturer.
 - c. Minimum pre-consumer and post-consumer recycled content levels as established in the Construction Documents.
 - d. Estimated material costs. Material costs should account for all taxes and transportation costs incurred by the contractor but exclude any cost for labor and equipment once the material has been delivered to the site.
- 4. MR credit 5: Regional Materials: Provide a copy of the MR credit 5 template with all of the information included below. The LEED Action Plan shall confirm that the project shall meet the goal of 20% regional materials by cost.
 - a. Estimated Materials Value (see 1.5 Submittals B. Materials Value).
 - b. List of all proposed regional materials, including material name and manufacturer.
 - c. Estimated fraction by weight or cost of material that is considered regional.
 - d. Estimated harvest and manufacture location and distance from project site as established in the Construction Documents.
 - e. Estimated material costs. Material costs should account for all taxes and transportation costs incurred by the contractor but exclude any cost for labor and equipment once the material has been delivered to the site.
- 5. MR Credit 7: Certified Wood: Provide a copy of the MR credit 6 template with all of the information included below. The LEED Action Plan shall confirm that the project shall meet the goal of 50% FSC-certified wood as a percentage of new wood by cost.
 - a. List of all proposed new permanently installed wood products, including material name and manufacturer.
 - b. Estimated fraction by weight, volume or cost of material that is considered new
 - c. Estimated fraction by weight, volume or cost of material that shall be FSC-certified.
 - d. Estimated material costs. Material costs should account for all taxes and transportation costs incurred by the contractor but exclude any cost for labor and equipment once the material has been delivered to the site.
- 6. EQ credit 3: Construction Indoor Air Quality (IAQ) Management Plan, During Construction: Provide a Construction IAQ Management Plan that addresses control measures for improved indoor air quality, as established by the SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3), and also the following. No particular format for the plan is required.
 - a. Procedures for protecting ductwork and equipment openings. All ductwork must be sealed in plastic from the time of fabrication until installation. All equipment openings must be sealed with plastic until connection or start-up. All ductwork must be stored at least 4" above floor level (on wooden pallets, for example).
 - b. Procedures for protecting stored on-site and installed absorptive materials from moisture damage and mold.
 - c. Procedures to minimize exposure of absorbent materials to VOC emissions.

- d. If air handlers must be used during construction, procedures for installation of temporary filtration media in all units and at all return grilles. Include a description of filtration media and its intended location. Temporary filtration media must have a minimum efficiency rating of MERV 8.
- e. Construction procedure for replacing all temporary filtration media immediately prior to building flush-out and/or IAQ testing. Include procedures for planning and programming the building flush-out and/or IAQ testing.
- f. Include a description of permanent filtration media to be used at each air handling or air supply unit. Permanent filtration media must have a minimum efficiency rating of MERV 13.
- g. Schedule of submission to Owner of dated and time-stamped photographs of on-site construction IAQ management procedures taken on at least three occasions during the construction period. 18 photos total are required. Include types of activities that will be documented by photo.
- D. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with Sustainable Design Action Plans for the following. The Owner will not review the Application for Payment until receipt of the Sustainable Progress Reports.
 - 1. Construction Waste Management: Provide waste reduction progress reports complying with Division 01 section Construction Waste Management. Include total project diversion rate to date.
 - 2. Recycled Content: Update the MR credit 4 template with actual purchasing data. In the right hand column entitled "Recycled Content Information Source" note which line items are "Estimates" and which line items are confirmed with GBMC Forms and "Manufacturer Data"
 - 3. Regional Materials: Update the MR credit 5 template with actual purchasing data. In the right hand column entitled "Harvest/Manufacturer Location Information Source" note which line items are "Estimates" and which line items are confirmed with GBMC Forms and "Manufacturer Data."
 - 4. Certified Wood: Update the MR credit 7 template with actual purchasing data. In the right hand column entitled "FSC COC Certificate Number from Vendor Invoice" note which line items are "Estimates" and which line items are confirmed with vendor invoices and "COC numbers."

E. LEED Documentation Submittals:

- Sustainable Sites:
 - a. SS prerequisite 1: Construction Activity Pollution Prevention: Provide six photos of sedimentation and erosion control measures in place on two separate occasions during construction. 12 photos total are required.
 - b. SS prerequisite 2: Environmental Site Assessment: Provide electronic copies of Phase I (and II, if applicable) Environmental Site Assessment reports and executive summaries from all ASTM site assessments performed.
 - c. SS credit 4.2: Alternative Transportation, Bicycle Storage & Changing Rooms: Provide manufacturer's cut sheets for all bike racks installed on site, including the total number of bicycle storage slots provided. Additionally, provide manufacturer's cut sheets for any alternative-fuel refueling stations installed on site, including fueling capacity information for an 8 hour period.
 - d. SS credit 5.2: Site Development: Maximize Open Space: Provide product data for landscaping materials.

- e. SS credit 7.1: Heat Island Effect, Non Roof: Provide manufacturer's cut sheets for all impervious paving materials, highlighting the Solar Reflectance Index (SRI) of the material. Also, provide cut sheets for all pervious paving materials.
- f. SS credit 7.2: Heat Island Effect, Roof: Submittals for roofing materials must include manufacturer's cut sheets or product data highlighting the Solar Reflectance Index (SRI) of the material.
- g. SS credit 8: Light Pollution Reduction: Provide drawings illustrating interior lighting controls and shading. Provide manufacturer's data for exterior lighting, including data on initial fixture lumens above 90 degrees from nadir for all exterior lighting fixtures, and for parking lot lighting, verification that the fixtures are classified by the IESNA as 'full cutoff' (FCO), OR provide documentation that exterior luminaires are IDA-Approved as Dark-Sky Friendly by the International Dark Sky Association (IDA) Fixture Seal of Approval Program. Additionally, provide a description of the light trespass analysis and photometric site plan that includes a footcandle summary table.

2. Water Efficiency:

- a. WE prerequisite 1: Water Use Reduction: Provide manufacturer's cut sheets for all water-consuming plumbing fixtures and fittings (toilets, urinals, faucets, showerheads, etc.) highlighting maximum flow rates and/or flush rates. Provide manufacturer's cut sheets for any aerators.
- b. WE credit 1: Water Efficient Landscaping: Provide product data for landscaping materials. Provide manufacturer's cut sheets for smart irrigation systems; i.e. drip, micromist, subsurface, etc.
- c. WE credit 4: Process Water Use Reduction: Provide manufacturer's cut sheets for all water-consuming commercial equipment (clothes washers, dishwashers, ice machines, etc.), highlighting water consumption performance. Include manufacturer's cut sheets or product data for any cooling towers, highlighting water consumption estimates, water use reduction measures, and corrosion inhibitors.

3. Energy & Atmosphere:

- a. EA prerequisite 1: Fundamental Commissioning: See Division 01 section General Commissioning Requirements.
- b. EA prerequisite 2: Provide manufacturer Air-Side HVAC data for supply air flow (cfm), outdoor airflow (cfm), supply fan power (kW) and exhaust fan power (kW). Provide manufacturer service water heating data for input rating (kW, MBH, etc.), efficiency (EL, SL, %, etc.) and storage volume (gal).
- c. EA prerequisite 3: Fundamental Refrigerant Management: Provide manufacturer's cut sheets for all cooling equipment highlighting refrigerants and indicating the absence of CFC refrigerants.
- d. EA credit 3: Enhanced Commissioning: See Division 01 section General Commissioning Requirements.
- e. EA credit 4: Enhanced Refrigerant Management: Provide manufacturer's cut sheets for all cooling equipment highlighting the type and quantity of refrigerants used, including ODP & GWP. Provide manufacturer's cut sheets indicating the absence of halons, CFCs and HCFS in the fire-suppression systems.
- f. EA credit 5: Measurement and Verification: Provide cut sheets and manufacturer's product data for all controls systems, highlighting electrical metering, gas metering, water metering, and any trending capability components.

4. Materials & Resources:

a. MR credit 2: Construction Waste Management: See Division 01 section Construction Waste Management for submittal requirements.

- b. MR credit 4: Recycled Content: Submittals for all products or materials expected to contribute to the recycled content calculation must include a completed Green Building Material Certification Form (GBMC Form) with the following LEED data. Only items in the CSI MasterFormat 2004 Divisions 03-10, 31 (Section 31.60.00 Foundations) and 32 (Sections 32.10.00 Paving, 32.30.33 Site Improvements, and 32.90.00 Planting) shall apply.
 - 1) Provide the Material Cost. Material costs should account for all taxes and transportation costs incurred by the contractor but exclude any cost for labor and equipment once the material has been delivered to the site.
 - 2) Provide manufacturer's product data, product literature, or a letter from the manufacture verifying the percentage of post-consumer and pre-consumer recycled content (by weight for assembly products) for each material or product.
- c. MR credit 5: Regional Materials: Submittals for all products or materials expected to contribute to the regional calculation must include a completed Green Building Material Certification Form (GBMC Form) with the following LEED data. Only items in the CSI MasterFormat 2004 Divisions 03-10, 31 (Section 31.60.00 Foundations) and 32 (Sections 32.10.00 Paving, 32.30.33 Site Improvements, and 32.90.00 Planting) shall apply.
 - 1) Provide the Material Cost. Material costs should account for all taxes and transportation costs incurred by the contractor but exclude any cost for labor and equipment once the material has been delivered to the site.
 - 2) Provide manufacturer's product data, product literature, or a letter from the manufacture verifying the percentage of the material or product by weight that complies with regional requirements.
 - 3) Provide manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of manufacture for each regional material or product. The manufacturer may indicate that the material or product is "manufactured within 500 miles of the project site."
 - 4) Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of extraction, harvest, or recovery for each regional material or product. The manufacturer may indicate that the material or product is "extracted/harvested/sourced within 500 miles of the project site."
- d. MR credit 7: Certified Wood: Submittals for all new permanently installed wood products (both those that shall be FSC-certified and those that shall not) must include a completed Green Building Material Certification Form (GBMC Form) with the following LEED data. Only items in the CSI MasterFormat 2004 Divisions 03-10, 31 (Section 31.60.00 Foundations) and 32 (Sections 32.10.00 Paving, 32.30.33 Site Improvements, and 32.90.00 Planting) shall apply.
 - 1) Provide manufacturer's product data, product literature, or a letter from the manufacturer verifying the percentage of the material or product by weight, volume or cost that is new wood.
 - 2) Provide manufacturer's product data, product literature, or a letter from the manufacture verifying the percentage of the material or product by weight, volume or cost that is FSC-certified wood.
 - 3) Provide vendors invoices that conform to the following requirements.
 - (a) Each new wood material or product must be identified on a line item basis and the cost for each item must be shown.

- (b) Each FSC-certified line item must be identified as either "FSC Pure," "FSC Mixed Credit," or "FSC Mixed [NN]%" (e.g. FSC Mixed 75%).
- (c) The Chain-of-Custody number for each FSC-certified line item must be shown.
- 5. Indoor Environmental Quality:
 - a. EQ prerequisite 1: Provide manufacturers cut sheet supplying total air flow and total outside airflow of relevant HVAC equipment.
 - b. EQ prerequisite 3: Provide manufacturers documentation for the noise reduction coefficient of each acoustical finish material.
 - c. EQ credit 1: Outdoor Air Delivery Monitoring: Provide manufacturer's cut sheets highlighting the installed air flow and carbon dioxide monitoring system components and sequence of controls shop drawing documentation, including CO2 differential set-points and alarm capabilities.
 - d. EQ credit 3: Construction Indoor Air Quality (IAQ) Management Plan, During Construction: Submittals include the following:
 - 1) Provide an approved, electronic copy of the Construction IAQ Management Plan.
 - 2) Provide manufacturer's cut sheets and product data for temporary filtration media used that highlights the Minimum Efficiency Reporting Value (MERV); minimum MERV rating of 8. Provide statement that lists manufacturer, model number, MERV rating and location of each installed filter.
 - 3) Provide manufacturer's cut sheets and product data for permanent filtration media to be installed prior to occupancy that highlights the Minimum Efficiency Reporting Value (MERV); minimum MERV rating of 13.
 - 4) Provide statement that lists manufacturer, model number, MERV rating and location of each installed filter.
 - 5) Provide dated and time-stamped photos documenting the implementation of each IAQ method on at least three occasions during the construction period. 18 photos total are required.
 - e. EQ credit 4.1: Low-Emitting Materials, Adhesives and Sealants: Provide a complete list of all adhesives, sealants, and sealant primers used on-site and inside the weatherproofing system of the building. Provide Manufacturer's Material
 - Safety Data Sheets (MSDS) or other Product Data highlighting the VOC content in g/L or percent VOC by weight for aerosol adhesives. All adhesives, sealants & sealant primers must comply with South Coast Air Quality Management District (SCAQMD) Rule #1168.
 - f. EQ credit 4.2: Low-Emitting Materials, Paints and Coatings: Provide a complete list of all paints, coatings, and primers used on-site and inside the weatherproofing system of the building. Provide Manufacturer's Material Safety Data Sheets (MSDS) or other Product Data indicating the chemical composition and the VOC content in g/L. All architectural paints & coatings, anti-corrosive & anti-rust paints, clear wood finishes, floor coatings, stains, primers and shellacs applied to interior elements of the building must not exceed the VOC limit specified in LEED Core & Shell 2009.
 - g. EQ credit 4.3: Low-Emitting Materials, Flooring Systems: Provide a complete list of all flooring systems used on-site and inside the weatherproofing system of the building, including the following submittals:
 - Manufacturers product data confirming that all concrete, wood, bamboo and cork floor finishes such as sealer, stain and finish must meet the requirements of South Coast Air Quality Management District (SCAQMD) Rule 113, Architectural Coatings, rules in effect on January 1, 2004.

- 2) Manufacturer's product data confirming tile setting adhesives and grout meet South Coast Air Quality Management District (SCAQMD) Rule 1168. VOC limits correspond to an effective date of July 1, 2005 and rule amendment date of January 7, 2005.
- 3) Certificate for all flooring elements illustrating that all materials comply with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale environmental Cambers, including 2004 Addenda.
- h. EQ credit 4.6: Low-Emitting Materials, Ceiling and Wall Systems: Provide manufacturer data for all gypsum board, insulation, acoustical ceiling systems and wall coverings installed on the building interior confirming that the product meets the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- i. EQ credit 5: Indoor Chemical and Pollutant Source Control: Provide manufacturer's cut sheets for all walk-off systems installed to capture particulates, including permanently installed grates, grilles, slotted systems, direct glue-down walk-off mats, and non-permanent roll-out mats. Provide manufacturer's cut sheets and product data for permanent filtration media to be installed prior to occupancy that highlights the Minimum Efficiency Reporting Value (MERV); minimum MERV rating of 13.
- j. EQ credit 6.1: Controllability of Systems, Lighting: Provide cut sheets and manufacturer's product data for all tasking lighting, sensors, and lighting controls.
- k. EQ credit 6.2: Controllability of Systems, Thermal Comfort: Provide cut sheets and manufacturer's product data for all thermal controls.
- 1. EQ credit 7: Thermal Comfort: Design: Provide cut sheets and manufacturer's product data for all thermal building & environmental control systems. Set point, changeover schedules, maintenance and operation instructions, and a maintenance and inspection schedule.

F. Closeout Submittals:

- 1. Upon completion of construction, prior to contract closeout, submit the following documentation in electronic format.
- 2. Final package per requirements of Division 01 Section 01 74 19 'Construction Waste Management.
- 3. Final materials and resources package for MR Credits 4, 5 and 7 containing:
 - a. Final template including total project materials cost and complete product list with costs demonstrating compliance with required threshold of achievement.
 - b. Electronic copies of relevant material product data for each product listed in the template.
- 4. Final LEED-online template and associated documentation uploaded to LEED-online project database for the following credits:
 - a. MR Credit 2: Construction Waste Management
 - b. MR Credit 4: Recycled Content
 - c. MR Credit 5: Regional Materials
 - d. MR Credit 7: Certified Wood

G. LEED Templates:

1. The Contractor is responsible for completing the following LEED templates and supporting documentation. The Contractor shall upload all data to LEED-Online for the Construction Review.

- a. SS prerequisite 1: Construction Activity Pollution Prevention
- b. SS credit 7.1: Heat Island Effect, Non-Roof
- c. EA credit 6: Green Power
- d. MR credit 2: Construction Waste Management
- e. MR credit 4: Recycled Content
- f. MR credit 5: Regional Materials
- g. MR credit 7: Certified Wood
- i. IEQ credit 3.1: Construction IAQ Management Plan, During Construction
- j. IEQ credit 3.2: Construction IAQ Management Plan, Before Occupancy
- k. IEQ credit 4.1: Low-Emitting Materials, Adhesives & Sealants
- 1. IEQ credit 4.2: Low-Emitting Materials, Paints and Coatings
- m. IEQ credit 4.3: Low-Emitting Materials: Flooring Systems
- n. IEQ credit 4.6: Low-Emitting Materials, Ceiling and Wall Systems
- 2. If GBCI requests any clarifications after the initial Construction Review, the Contractor will provide all necessary additional documentation within 10 business days.

1.6 QUALITY ASSURANCE

- A. Construction Job Conferences: The status of compliance with the Sustainable Design Requirements of these specifications will be an agenda item at all regular job meetings conducted during the course of work at the site.
- B. LEED Coordinator: Identify and engage at least one experienced LEED Accredited Professional from the General Contractor responsible for implementing, monitoring, reporting, and distributing all the required LEED documentation. LEED Coordinator must have experience from at least one LEED certified project.

PART 2 - PRODUCTS

2.1 PRODUCT ENVIRONMENTAL REQUIREMENTS

- A. SS prerequisite 1: Construction Activity Pollution Prevention: When clearing site, use topsoil from the site and chipping wood material on site for mulch reduces transportation impacts and avoids the effect of producing topsoil and mulch at remote sites. Do not burn rubbish, organic matter, etc. or any material on the site. Dispose of in accordance with Construction Waste Management Specification Section 01 74 19 "Construction Waste Management".
- B. SS credit 7.1: Heat Island Effect, Non-Roof: Site hardscape (including roads, sidewalks, courtyards and parking lots) must comply with the following requirements for a minimum of 50% within the LEED Project Boundary:
 - 1. Provide shade from the existing tree canopy or within 5 years of landscape installation.
 - 2. Provide shade from architecture devices or structures that have a solar reflectance index (SRI) of at least 29.
 - 3. Use an open-grid pavement system (at least 50% pervious).
- C. SS credit 7.2: Non-Heat Island Effect, Roof: All roofing systems, other than vegetated roof systems, must comply with the following requirements:
 - 1. Low-Sloped roofing less than or equal to 2:12 slope must have an SRI of at least 78.
 - 2. Steep-Sloped roofing greater than 2:12 slope must have an SRI of at least 29.
- D. SS credit 8: Light Pollution Reduction: Interior lighting within view from the exterior and exterior lighting design, must comply with the following requirements
 - 1. The input power of all nonemergency interior luminaires with a direct line of site to any opening in the envelope must be reduced by at least 50% between 11 P.M. and 5 A.M.

- Alternatively, the luminaires may be blocked from exterior view by automatically controlled shielding during these hours.
- 2. All exterior luminaires must emit 0% of the total initial designed fixture lumens at an angle above 90° from nadir and/or meet the requirements of the Dark Sky certification program.
- 3. Exterior lighting cannot exceed 80% of the lighting power densities defined by ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments.
- E. WE prerequisite 1: Water Use Reduction: Flow and flush rates shall not exceed the following:
 - 1. Toilets: Dual-Flush Flush Valves 1.6/1.1 gallons per flush.
 - 2. Urinals: 0.125 gallons per flush
 - 3. Public Lavatory Faucets: 0.35 gallons per minute
 - 4. Private Lavatory Faucets: 0.5 gallons per minute
 - 5. Classroom Faucets: 0.5 gallons per minute
 - 6. Kitchen Faucets: 0.5 gallons per minute
 - 7. Showerheads: 1.5 gallon per minute
- F. WE credit 1: Water Efficient Landscaping:
 - 1. All vegetation is to be drought tolerant, native, and/or locally adapted.
 - 2. Any permanently installed irrigation must use either drip, micromist, high efficiency spray and/or subsurface irrigation systems with smart irrigation controls.
- G. EA prerequisite 3: Fundamental Refrigerant Management:
 - 1. Base building HVAC&R systems shall use zero chlorofluorocarbon (CFC)-base refrigerants. Base building HVAC&R systems shall contain no refrigerants other than the following: HCFC-123, HFC-134a, HFC-245fa, HFC-407c, or HFC 410a.
- H. EA credit 4: Enhanced Refrigerant Management:
 - 1. Fire-suppression systems shall contain no HCFCs and Halons.
- I. MR credit 4: Recycled Content of Materials: For materials in CSI MasterFormat 2004 Divisions 03-10, 31 (Section 31.60.00 Foundations) and 32 (Sections 32.10.00 Paving, 32.30.33 Site Improvements, and 32.90.00 Planting) provide building materials with recycled content such that post-consumer recycled content value plus half the pre-consumer recycled content value constitutes a minimum of 20% of the Materials Value for the Project (by cost). The Contractor shall make all attempts to maximize the procurement of materials with recycled content.
 - 1. The post-consumer recycled content value of a material shall be determined by dividing the weight of post-consumer recycled content by the total weight of the material and multiplying by the cost of the material.
 - 2. The pre-consumer recycled content value of a material shall be determined by dividing the weight of pre-consumer recycled content by the total weight of the material and multiplying by the cost of the material.
 - 3. Exclude mechanical, electrical, plumbing, furniture and furnishings, and specialty items such as elevators and equipment. Do not include labor and equipment costs in the calculations.
 - 4. Recycled content of materials shall be defined according to the Federal Trade Commission's "Guide for the Use of Environmental Marketing Claims," 16 CFR 260.7 (e).
 - 5. Calculating Assembly Recycled Content: For assembly recycled content values, determine the percentage by weight of the post-consumer recycled content and the pre-consumer recycled content. For subcomponents, determine the percentages of post-consumer and per-consumer recycled content by using the weights of the component elements. No

consideration is given to relative costs of the materials or the subcomponents when calculating these percentages of recycled content.

- J. MR credit 5: Regional Materials: For materials in CSI MasterFormat 2004 Divisions 03-10, 31 (Section 31.60.00 Foundations) and 32 (Sections 32.10.00 Paving, 32.30.33 Site Improvements, and 32.90.00 Planting) provide building materials which have been extracted, harvested, or recovered AND manufactured within a 500 mile radius of the project site that constitute 20% of the Materials Value for the Project (by cost). The Contractor shall make all attempts to maximize the procurement of materials within this specified 500 mile radius.
 - 1. Exclude mechanical, electrical, plumbing, furniture and furnishings, and specialty items such as elevators and equipment. Do not include labor and equipment costs in the calculations.
 - 2. For materials with more than one point of manufacture or extraction, all within the 500-mile radius, list the component with the greatest distance.
 - 3. If a portion of the material was either manufactured or extracted beyond the 500-mile radius, list only that portion and associated cost satisfying the credit requirement.
- K. MR credit 7: Certified Wood: For new permanently-installed wood materials in CSI MasterFormat 2004 Divisions 03-10, 31 (Section 31.60.00 Foundations) and 32 (Sections 32.10.00 Paving, 32.30.33 Site Improvements, and 32.90.00 Planting) provide FSC-certified wood products that constitute 50% of new wood products (by cost).
 - 1. New wood materials include, but are not limited to, lumber, composite wood, engineered wood products, or wood-based panel products.
 - 2. Furniture and furnishings are not included in credit calculations.
 - 3. Calculating Assembly Wood Products: To determine the value of the wood components, calculate the amount of new wood as a percentage of the total weight, volume, or cost, and the amount of FSC-certified wood as a percentage of the total weight, volume, or cost.
- L. IEQ credit 1: Outdoor Air Delivery Monitoring: Direct outdoor airflow measurement devices must be capable of measuring the outdoor intake flow with a minimum accuracy of plus or minus 15% of the design minimum outdoor air rate, as defined by ASHRAE 62.1-2007 (with errata but without addenda) for mechanical ventilation systems where 20% or more of the design airflow serves non-densely occupied spaces
- M. IEQ credit 3.1: Construction Indoor Air Quality (IAQ) Management Plan, During Construction
 - 1. All ductwork must be sealed in plastic from the time of fabrication until installation. All equipment openings must be sealed with plastic until connection or start-up.
 - 2. If air handling units are used during construction, install temporary filtration media during construction that provides a Minimum Efficiency Reporting Value (MERV) of 8 or better in all air handling units and at all return grilles. Replace all temporary filtration media prior to occupancy.
- N. IEQ credit 3.2: Construction Indoor Air Quality (IAQ) Management Plan, Before Occupancy:
 - Before the building flush-out and prior to occupancy, replace all air filtration media that
 provides a Minimum Efficiency Reporting Value (MERV) of 13 or better in all air
 handling units for processing both return and outside air that is delivered to the air supply
 system as determined by ASHRAE Standard 52.2-1999.
- O. IEQ credit 4.1: Low-Emitting Materials, Adhesives and Sealants:
 - 1. For interior applications that are inside of the weatherproofing system of the building, use adhesives, sealants and sealant primers that comply with the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule #1168 effective date of July 1, 2005 and rule amendment date of January 7, 2005.

- 2. All aerosol adhesives must comply with Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.
- 3. Sealants and glazing compounds formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure) fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components shall not be used.
- P. IEQ credit 4.2: Low-Emitting Materials, Paints and Coatings: For interior applications that are inside of the weatherproofing system of the building, use paints, coatings and primers that comply with the following limits for VOC content established in Green Seal Standard GS-11, Paints, First Edition, May 20, 1993:
 - 1. Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC—03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997. Architectural Adhesives.
 - 2. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to interior elements must not exceed the VOC content limits established in South Coast Air Quality Management District (SMAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.
- Q. IEQ credit 4.3: Low-Emitting Materials, Flooring Systems:
 - 1. All carpet installed in the building interior must meet the testing and product requirements of the Carpet and Rug Institute Green Label Plus program.
 - 2. All flooring adhesives and sealants must meet the requirements of EQc4.1: Low-Emitting Materials, Adhesives and Sealants.
 - 3. Hard surface flooring shall be certified as compliant with FloorScore standard or equivalent testing protocol and criteria by independent third-party. Mineral based finish floor products such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring are not required to meet the testing requirements noted above.
- R. IEQ credit 4.6: Ceiling and Wall Systems:
 - All gypsum board, insulation, acoustical ceiling systems and wall coverings installed in the building interior must meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources using Small-Scale Environmental Chambers, including 2004 Addenda.
- S. IEQ credit 5: Indoor Chemical and Pollutant Source Control: Filtration media installed in all air handling units for processing both return and outside air that is delivered to the air supply system must provide a Minimum Efficiency Reporting Value (MERV) of 13 or better.
- T. ID credit 1.1: Low-Mercury Lamping and Re-Lamping Policy:
 - 1. At least 90% of installed lamps, including both indoor and outdoor fixtures, as well as both hard-wired and portable fixtures, must achieve an overall average of mercury content of 90 picograms per lumen-hour or less. Lamps containing no mercury may be counted toward plan compliance only if they have energy efficiency at least as good as their mercury-containing counterparts. Screw-based, integral compact fluorescent lamps may be excluded from the calculation if they comply with the voluntary industry guidelines for maximum mercury content published by the National Electric Manufacturers Association (NEMA).

PART 3 - EXECUTION

3.1 LEED-RELATED PROCEDURES

- A. Fundamental Commissioning: All building energy-related systems and building envelope components shall be commissioned in accordance with the requirements of Division 01 section General Commissioning Requirements and related commissioning sections in other divisions in order to verify and ensure that fundamental building elements and systems are installed, constructed, calibrated to operate, and perform according to the Owner's Project Requirements, Basis of Design, and Construction Documents.
- B. Construction Waste Management: Develop and implement a Construction Waste Management Plan (CWMP), as defined in Division 01 section Construction Waste Management," quantifying material diversion by weight in order to recycle, reuse, and/or salvage at least 75% (by weight) of construction and demolition waste.
- C. Construction IAQ Management Plan, During Construction: Develop and implement an Indoor Air Quality (IAQ) Management Plan that complies with the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3) for the construction and pre-occupancy phases of the building including, at a minimum, the following procedures:
 - 1. Protect HVAC equipment from dust, debris, and odors. Specifically:
 - a. Best practices shall be employed to protect ductwork from dirt and debris when delivered and stored on-site. All ductwork shall be sealed in plastic from time of fabrication until installation/connection. Plastic seals must be maintained throughout installation.
 - b. After installation, all ductwork and equipment openings shall be sealed with plastic. Plastic seals must be maintained until start-up.
 - 2. Prevent mold and mildew growth including protecting absorptive materials (stored on-site or installed) from moisture damage. Specifically:
 - a. Exercise special care at all times in the storage of materials to prevent exposure to moisture.
 - b. Avoid installation of gypsum wallboard and other porous materials until the building is weather-tight.
 - c. All standing water which accumulates on interior floors shall be removed on the day that it is observed.
 - d. Any drywall that has retained more than 20% moisture after 48 hours following exposure to moisture, or that has evidence of mold, must be disposed of in accordance with Division 01 section Construction Waste Management.
 - e. The contractor shall identify and remove all porous building materials that become wet or damaged by moisture within 7 calendar days of such exposure.
 - 3. Minimize exposure of absorbent materials to VOC emissions.
 - 4. Submit to Owner of photographs of on-site construction IAQ management measures such as protection of ducts and on-site stored or installed absorptive materials.
 - 5. If air handling units are utilized during construction, install temporary filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 8 or better in the units and at return grills. Inspect weekly and replace as required
 - a. Including new air handling units and existing air handling units serving existing pedestrian bridge.
 - 6. Replace all temporary air-filtration media after completion of construction and prior to building flush-out and/or IAQ testing.

- 7. Construction procedures for achievement of EQ credit 3.2: Construction IAQ Management Plan, Before Occupancy, such as scheduling and programming of building flush-out and/or IAQ testing.
- 8. Install permanent filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 8 or better in all air handling units for processing both return and outside air that is delivered to the air supply system.
- Discuss IAQ Management procedures and measures as an agenda item at all regular job
 meetings conducted during the course of work at the site and record progress in meeting
 minutes
- D. Fundamental Commissioning: All building energy-related systems and building envelope components shall be commissioned in accordance with the requirements of Division 01 section General Commissioning Requirements and related commissioning sections in other divisions in order to verify and ensure that fundamental building elements and systems are installed, constructed, calibrated to operate, and perform according to the Owner's Project Requirements, Basis of Design, and Construction Documents.

SECTION 01 35 17 - LEED SUBMITTAL FORM

PART 1 - GENERAL

1.1 LEED SUBMITTAL FORM

A. Instructions:

- 1. Contractor shall include the following Green Building Materials Certification Form with each LEED submittal as required by the specifications for Divisions 3-10 and 31-32.
- 2. For each item attempting compliance with the credit requirements listed on the form and in 1.1B, Contractor shall include supporting documentation. See supporting documentation types below.
- 3. It is mandatory that the Contractor provide material cost as described below.

B. Applicable LEED Credits:

- 1. MR Credit 3 Materials Reuse.
- 2. MR Credit 4 Recycled Content.
- 3. MR Credit 5 Regional Materials.
- 4. MR Credit 6 Rapidly Renewable Materials.
- 5. MR Credit 7 Certified Wood.
- 6. EQ Credit 4.1 Adhesives & Sealants.
- 7. EQ Credit 4.2 Paints and Coatings.
- 8. EQ Credit 4.3 Flooring Systems.
- 9. EQ Credit 4.4 Composite Wood and Agrifiber Products.

1.2 SUPPORTING DOCUMENTATION

- A. Acceptable supporting documentation may include:
 - 1. MSDS Sheet.
 - 2. Manufacturer's Cut Sheet.
 - 3. Manufacturer's Statement.
 - 4. Industry Statement.
 - 5. Other Verification.

1.3 ATTACHMENT

A. Green Building Materials Certification Form.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

Green Building Material	s Certification For	<u>m</u>													
Contractor											Project Name)			
Contact Name		Specification Section													
Telephone Number											Submittal Nur	mber			
Date															
	Manufacturer	Product Name	Material Cost	MRc4: Recycled Content		ı	MRc5: Local/Re	egional Materia	ls	MRc6: Rapidly Renewable Materials		MRc7: Certified Wood			EQc4: VOC Content
MATERIAL		and/or Number (attach cut sheets)	(Less Labor & Equipment)	Post- Consumer	Pre- Consumer	Percent manufactured locally	Manufacture Distance from Project Site	Percent extracted locally	Extraction Distance from Project Site	Percent rapidly renewable materials	Rapidly renewable material type	Percent Wood	Percent Certified Wood	Forest Stewardship Council COC	(adhesives, sealants, paints, coatings, flooring, ceilings)
			[\$]	[%]	[%]	[%]	[in miles]	[%]	[in miles]	[%]		[%]	[%]	Number	[g/L]
Instructions: Please complete this form must be included with the in this form, such as cut-s	regular product sub	mittal to be reviewe	d. Material cost in												
* For all wood based prod										the purchase	order or receip	t.			
* For all composite wood Definitions:	products, provide de	ocumentation from t	ne manufacturer,	such as an l	MSDS shee	t to document	"no added ure	a-tormaldehyd	e."						
Post-Consumer Recycled	Content: the portion	n of a material or pro	oduct which derive	es from disca	arded consu	umer waste tha	at has been red	covered for use	e as a raw mat	erial (i.e. plast	ic bottles, new	spaper, alumir	num cans).		
Pre-Consumer Recycled (after a minimum amount of								diverted from r	nunicipal solid	waste for use	in a different n	nanufacturing p	process that ar	e combined w	th other constituents
Manufactured Locally: a p lumber from Keene, NH, a							provided to on	-site tradesma	n is sourced fr	om within a 50	0-mile radius.	For example,	if the hardware	e comes from	Dallas, TX, the
Extracted Locally: a product or material that is made from raw materials that were harvested, extracted, or sourced within a 500-mile radius of the project site.															
FSC-certified Wood: wood-based products or materials that have received Forest Stewardship Council (FSC) certification.															

VOC Content: the quantity of volatile organic compounds in products such as adhesives, sealants, sealant primers, paints, primers, and architectural coatings. VOC is to be reported in grams/liter or lbs/gallon. VOC requirements only apply to products

be provided by our company as components of the building construction. Furthermore, I understand that any change in such "green building" material characteristics during the purchasing and/or installation will require written approval from the Construction Manager and Owner.

, hereby certify that the information contained herin accurately represents the listed "green building" characteristics of the materials to

applied inside the weatherproofing of the building.

, an authorized representative of _

Contractor Certification:

SECTION 01 35 53 - SECURITY PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Security measures including formal security program, entry control, personnel identification, and miscellaneous restrictions.

1.2 SECURITY PROGRAM

- A. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
- B. Initiate program at project mobilization.
- C. Maintain program throughout construction period until Owner occupancy.
- D. Coordinate with Owner security requirements for portion of site under Owner control.

1.3 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site and existing facilities.
- B. Allow entrance only to authorized persons with proper identification.
- C. Maintain log of workers and visitors, make available to Owner on request.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. References and standards.
- B. Quality assurance submittals.
- C. Mock-ups.
- D. Control of installation.
- E. Tolerances.
- F. Testing and inspection services.
- G. Manufacturers' field services.

1.2 REFERENCE STANDARDS

- A. ASTM D3740 Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- B. ASTM E329 Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. 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.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- C. Schedule of Tests and Inspections: Prepare in tabular form, within 30 days following mobilization, and include the following:
 - 1. Specification section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- D. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- E. Test Reports: After each test/inspection, promptly submit two 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. Conformance 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 conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- F. 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 conforms to 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.
- G. 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.
- H. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit report in duplicate within 30 days of observation to Architect for information.
 - 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.4 REFERENCES AND STANDARDS

- A. For products and 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. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 TESTING AND INSPECTION AGENCIES

- A. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform specified testing.
 - 1. The individual specification section must clearly state that testing is the Owner's responsibility, otherwise the testing to be executed by Contractor.
- 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 E 329.
 - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
 - 3. Laboratory: Authorized to operate in the State of Maryland.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 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.
- H. Contractor must develop a plan to monitor and control installation and protection of Work to ensure compliance with LEED requirements specified elsewhere and acoustical integrity, including but not limited to the following:
 - 1. Clear airspace with no bridging elements at structural isolation joints.
 - 2. Independence of steel stud framing and/or masonry at double/triple wall construction.
 - 3. Mass and airtightness of gypsum board assemblies.
 - 4. Solidity, mass, and airtightness of concrete and masonry construction.
 - 5. Grout fill at sound-rated/sound-control door and window frames.
 - 6. Mass of sound-control door leaves.
 - 7. Tolerances between sound-rated/sound-control doors, frames, thresholds, and perimeter seals
 - 8. Proper compression and adjustment of perimeter seals at sound-rated/sound-control doors.
 - 9. Locations and quiet operation of door latching and closer hardware.
 - 10. Tolerances between window sashes, frames, and perimeter seals.
 - 11. Thicknesses of laminated glazing and airtightness of perimeter seals at sound-control windows

- 12. Extent and coverage of sound-attenuation blankets above ceilings and in partitions.
- 13. Shaping of wall and ceiling finishes.
- 14. Extent, location, and thickness of sound-absorbing finishes.
- 15. Extent, location, operation, and storage of adjustable sound-absorbing drapery.
- 16. Extent and shaping of ceiling reflectors.
- 17. Acoustical transparency of scrim materials.
- 18. Rigid attachment of finish materials to substrates.
- 19. Restrictions on routing of ductwork, piping, conduit, wiring, cable and sleeves.
- 20. Resilient sealing of penetrations.
- 21. Sheet caulking at electrical boxes within gypsum board assemblies.
- 22. Flexible connections of plumbing, mechanical, electrical, and communications systems at equipment and structural isolation joints.
- 23. Sound power/pressure level limits of mechanical equipment and air devices.
- 24. Vibration isolation of conveying, plumbing, mechanical, electrical, and communications systems.
- 25. Location and performance of duct sound attenuators.
- 26. Internal duct lining in ductwork, plenums, and shafts.
- 27. External lagging of ductwork and piping.
- 28. Locations of volume control dampers.
- 29. Location and orientation of transfer ducts.
- 30. Reports for testing, adjusting, and balancing of HVAC systems.
- 31. Silent operation of theatrical and architectural lighting.
- 32. Silent operation of fluorescent ballasts.
- 33. Silent operation of fire alarm system in standby mode.
- 34. Remote location of transformers and power supplies.

3.2 MOCK-UPS

- A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections and as shown on the drawings.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. 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.

3.3 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.

3.4 TESTING AND INSPECTION

- A. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.

- 2. Perform specified sampling and testing of products in accordance with specified standards.
- 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- 4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
- 5. Perform additional tests and inspections required by Architect.
- 6. Submit reports of all tests/inspections specified.
- B. 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.

C. 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 and to manufacturers' facilities.
- 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 24 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.
- D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.5 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 of 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.

3.6 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to 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.

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Security requirements.

1.2 RELATED REQUIREMENTS

- A. Section 01 51 00 Temporary Utilities.
- B. Section 01 52 13 Field Offices and Sheds.
- C. Section 01 55 00 Vehicular Access and Parking.
- D. Section 01 35 53 Security Procedures.
- E. Section 01 57 21 Indoor Air Quality Controls.
- F. Section 01 58 13 Temporary Project Signage.
- G. Section 01 61 16 Volatile Organic Compound (VOC) Content Restrictions.

1.3 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
 - 2. Internet Connections: Minimum of one; DSL modem or faster.
 - 3. Email: Account/address reserved for project use.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.5 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.6 FENCING

A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.7 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

SECTION 01 51 00 - TEMPORARY UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Electricity, lighting, heat, and water.
- B. Existing Utilites: All existing utilites are to be maintained and are to remain active for the project duration while in use by existing school.

1.2 RELATED REQUIREMENTS

A. Section 01 50 00 - Temporary Facilities and Controls: Telephone service for administrative purposes.

1.3 TEMPORARY ELECTRICITY

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.
- D. Provide main service disconnect and over-current protection at convenient location and meter.
- E. Permanent convenience receptacles may be utilized during construction.
- F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- C. Maintain lighting and provide routine repairs.

1.5 TEMPORARY HEATING

- A. Cost of Energy: By Contractor.
- B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- D. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.6 TEMPORARY COOLING

- A. Cost of Energy: By Contractor.
- B. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.

- C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- D. Prior to operation of permanent equipment for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.7 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

SECTION 01 52 13 - FIELD OFFICES AND SHEDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary field offices for use of Architect.
- B. Temporary field offices for use of Contractor.
- C. Maintenance and removal.

PART 2 PRODUCTS

2.1 MATERIALS, EQUIPMENT, FURNISHINGS

A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.2 CONSTRUCTION

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove when no longer needed.
- C. Lighting for Offices: 50 fc at desk top height, exterior lighting at entrance doors.

2.3 ENVIRONMENTAL CONTROL

A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions.

2.4 CONTRACTOR OFFICE AND FACILITIES

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- C. Other Furnishings: Contractor's option.
- D. Equipment: Six adjustable band protective helmets for visitors, one 10 inch outdoor weather thermometer.

2.5 OWNER AND ARCHITECT/ENGINEER OFFICE

- A. Separate space for sole use of Owner and Architect, with separate entrance door with new lock and two keys.
- B. Area: At least 150 sq ft, with minimum dimension of 8 ft.
- C. Minimum four 110 volt duplex convenience outlets, one on each wall.
- D. Telephone: As specified in Section 01 50 00.
- E. Furnishings:
 - 1. One desk 54 by 30 inch, with three drawers.
 - 2. One drafting table 36 by 72 inch, with one equipment drawer and a 48 inch wide parallel straight edge.
 - 3. One metal, double-door storage cabinet under table.
 - 4. Plan rack to hold working Drawings, shop drawings, and record documents.
 - 5. One standard four-drawer legal size metal filling cabinet with locks and two keys per lock.
 - 6. Six linear ft of metal bookshelves.

- 7. Two swivel arm chairs.
- 8. One drafting table stool.
- 9. One tackboard 36 by 30 inch.
- 10. One waste basket per desk and table.

PART 3 EXECUTION

3.1 PREPARATION

A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.2 INSTALLATION

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
- B. Parking: Two hard surfaced parking spaces for use by Owner and Architect, connected to office by hard surfaced walk.

3.3 MAINTENANCE AND CLEANING

- A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.
- B. Maintain approach walks free of mud, water, and snow.

3.4 REMOVAL

A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

SECTION 01 55 00 - VEHICULAR ACCESS AND PARKING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Driveways, entrance and traffic routes.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Permanent pavements and parking facilities.
- E. Construction parking controls.
- F. Haul routes.
- G. Traffic signs and signals.
- H. Maintenance.
- I. Removal, repair.
- J. Mud from site vehicles.

PART 3 EXECUTION

2.1 DRIVEWAYS, ENTRANCE AND TRAFFIC ROUTES

- A. Keep driveways and entrances serving premises and site surrounding Project clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Provide continuous monitoring of site.
 - 1. Schedule deliveries to minimize use of driveways and entrances.
 - 2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Truck deliveries shall be scheduled so that the streets adjacent to the site do not back up with delivery trucks waiting to deliver materials. Trucks must be scheduled accordingly, or wait to unload inside the fence in the project site or off the Owner's property.

2.2 PARKING

- A. Use of existing parking facilities by construction personnel is not permitted.
- B. Use of new parking facilities by construction personnel is not permitted.
- C. Do not allow heavy vehicles or construction equipment in parking areas.
- D. Arrange for temporary parking areas to accommodate use of construction personnel.
- E. When site space is not adequate, provide additional off-site parking.
- F. Locate as approved by Architect.

2.3 Permanent pavements and parking facilities

- A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.
- B. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.

2.4 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.

- B. Monitor parking of construction personnel's vehicles. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

2.5 HAUL ROUTES

- A. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

2.6 TRAFFIC SIGNS AND SIGNALS

- A. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
- B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
- C. Relocate as Work progresses, to maintain effective traffic control.

2.7 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, Products, mud, snow, and ice.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

2.8 REMOVAL, REPAIR

- A. Repair existing and new permanent facilities damaged by use, to original condition.
- B. Remove equipment and devices when no longer required.
- C. Repair damage caused by installation.

2.9 MUD FROM SITE VEHICLES

A. Provide means of removing mud from vehicle wheels before entering streets.

SECTION 01 57 21 - INDOOR AIR QUALITY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Construction procedures to promote adequate indoor air quality during and after construction.
- B. Building flush-out after construction and before occupancy.
- C. Testing indoor air quality after completion of construction.

1.2 PROJECT GOALS

- A. See Section 01 35 15 LEED Certification Procedures, for overall project goals relating to environment and energy.
- B. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
 - 1. Cleaning of ductwork is not contemplated under this Contract.
 - 2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
- C. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
 - 1. Furnish products meeting the specifications.
 - 2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.3 REFERENCE STANDARDS

- A. ASTM D5197 Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology); 2009.
- B. 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.
- C. EPA 600/4-90/010 Compendium of Methods for the Determination of Air Pollutants in Indoor Air; April 1990.
- D. EPA 625/R-96/010b Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air; Jan-99.
- E. SMACNA (OCC) IAQ Guidelines for Occupied Buildings Under Construction; 2007.

1.4 DEFINITIONS

- A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
- B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
- C. Particulates: Dust, dirt, and other airborne solid matter.
- D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.
- E. Ventilation: The process of supplying and removing air to and from interior spaces by natural or mechanical means.

F. Volatile Organic Compound (VOC): Carbon compounds that participate in atmospheric photochemical reactions, (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate); the compounds vaporize (become a gas) at normal room temperatures.

1.5 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality upon completion; use SMACNA (OCC) as a guide.
 - 1. Submit not less than 60 days before enclosure of building.
 - 2. Identify potential sources of odor and dust.
 - 3. Identify construction activities likely to produce odor or dust.
 - 4. Identify areas of project potentially affected, especially occupied areas.
 - 5. Evaluate potential problems by severity and describe methods of control.
 - Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
 - 7. Describe cleaning and dust control procedures.
 - 8. Describe coordination with commissioning procedures.
- C. Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to adsorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.
- D. Duct and Terminal Unit Inspection Report.
- E. Air Contaminant Test Plan: Identify:
 - 1. Testing agency qualifications.
 - 2. Locations and scheduling of air sampling.
 - 3. Test procedures, in detail.
 - 4. Test instruments and apparatus.
 - 5. Sampling methods.
- F. Air Contaminant Test Reports: Show:
 - 1. Location where each sample was taken, and time.
 - 2. Test values for each air sample; average the values of each set of 3.
 - 3. HVAC operating conditions.
 - 4. Certification of test equipment calibration.
 - 5. Other conditions or discrepancies that might have influenced results.
- G. LEED Closeout Submittals:
 - 1. General: At completion of construction and prior to contract close-out, submit the following for information purposes in electronic format.
 - 2. Final Construction Indoor Air Quality Management, During Construction, Package for IEQ Credit 3.1: At completion of construction and prior to contract close-out, submit:
 - a. Approved Construction Indoor Air Quality Management Plan.
 - b. Construction Photographs: Six taken at 3 separate times for a total of eighteen (18) digital photographs of required construction indoor air quality management measures.
 - 1) HVAC protection.
 - 2) Source Control.

- 3) Pathway Interruption.
- 4) Housekeeping.
- 5) Scheduling.
- 6) Protection of absorptive or dry sink materials, including but not limited to carpet, gypsum board, acoustical ceiling tiles, and insulation.
- 7) Temporary filtration media, if HVAC is operated during construction.
- c. Product data of filtration media used during construction and installed immediately prior to occupancy including MERV values, manufacturer's name and model number.
- d. Meeting minutes, checklists, worksheets, notifications and deficiency or resolution logs related to the project IAQ issues.
- e. Final LEED IEQ Credit 3.1 Online Template indicating compliance with credit requirements.
- 3. Final Construction Indoor Air Quality Management Plan, Prior to Occupancy, Package for IEQ Credit 3.2: At completion of construction and prior to contract close-out, submit:
 - a. Compliance Path Option 1: Approved Building Flush-out Schedule including a statement that space was not occupied until after delivery of minimum outside air requirements were met.
 - b. Compliance Path Option 2: Baseline Indoor Air Quality Testing reports showing results and location of each test indicating that the maximum chemical contaminate concentration requirements are not exceeded, a summary of HVAC operating conditions, a listing of discrepancies and recommendations for corrective actions, if needed.
 - 1) Include certification of test equipment calibration with each test report.
 - c. Final LEED IEQ Credit 3.2 Online Template indicating compliance with credit requirements.
- 4. Final Low Emitting Materials Package for IEQ Credits 4.1, 4.2, 4.3, and 4.4: Provide individual electronic folders for each credit containing:
 - a. Legible electronic copies of relevant material product data, with applicable criteria highlighted, for each product listed on the LEED Online Template.
 - b. Final LEED Online Template including all low-emitting materials used on Project.
- 5. LEED Online: Final LEED Online Template and associated required documentation uploaded to LEED Online for each of the following Credits:
 - a. IEQ Credit 3.1, Construction Indoor Air Quality Management, During Construction.
 - b. IEQ Credit 3.2, Construction Indoor Air Quality Management, Prior to Occupancy.
 - c. IEQ Credit 4.1, Low Emitting Materials, Adhesives and Sealants.
 - d. IEQ Credit 4.2, Low Emitting Materials, Paints and Coatings.
 - e. IEQ Credit 4.3, Low Emitting Materials, Carpet Systems.
 - f. IEQ Credit 4.4, Low Emitting Materials, Composite Wood and Agrifiber Products.

1.6 SCHEDULING

- A. Coordinate construction activities to minimize or eliminate disruption of operations in occupied portions of building.
- B. Schedule for storage, installation, and protection of all components of air distribution systems.
- C. Schedule for storage, installation, and protect of absorptive materials (woven, fibrous or porous in nature, such as carpet, ceiling tiles, insulation, and fabrics) from exposure to emissions during and after installation from materials and finishes with potential for short-term release of off-gassing volatile organic compounds.

- 1. Highlight critical methods used to protect absorptive materials from airborne pollutants such as: dust, debris, moisture, gaseous and microbial contamination.
- 2. Sequence installation of absorptive materials after odor-emitting activities have occurred and have been mitigated by ventilation.
- D. Do not store absorptive materials on-site if protection measures as described above cannot be ensured.
- E. Avoid building occupancy while construction related pollutants are present.
- F. Ensure proper and complete curing of concrete before covering.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.
- B. Auxiliary Air Filters:
 - 1. MERV of 8, minimum, when tested in accordance with ASHRAE 52.2, during construction
 - 2. MERV of 13, minimum, when tested in accordance with ASHRAE 52.2, installed prior to occupancy.

PART 3 EXECUTION

3.1 CONSTRUCTION PROCEDURES

- A. Prevent the absorption of moisture and humidity by adsorptive materials by:
 - 1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
 - 2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
 - 3. Provide sufficient ventilation for drying within reasonable time frame.
- B. Begin construction ventilation when building is substantially enclosed.
- C. HVAC system shall be kept clean, free of dust, debris, moisture, gaseous and microbial contamination during storage, handling, installation and punch-out. Inspect all air inlets, air outlets, grilles, diffusers, plenums, and ducts upon completion of Work.
 - 1. Cover and protect (taped plastic or similar method) all exposed air inlet and outlet openings, grilles, ducts, plenums, to prevent water, moisture, dust and other contaminate intrusion.
 - 2. Apply protection immediately after installation of equipment and ducting.
 - 3. Ducting runs that require more than a single day to install shall be protected at end of each day's Work.
 - 4. Leaks in return ducts and air handlers shall be checked and repaired.
 - 5. Inspect filtration monthly and replace as needed with new media throughout the HVAC system; filtration media shall be minimum MERV 8.
 - 6. After final phase of construction, install new filtration media throughout the HVAC system; filtration media shall be minimum MERV 8.
 - 7. Cleaning of ductwork is not part of this contract; however Contractor shall bear cost of cleaning required by Owner due to failure of Contractor to protect ducts and equipment from construction pollutants as specified.
- D. HVAC equipment and ductwork may NOT be used for ventilation during construction:
 - 1. Provide temporary ventilation equivalent to 1.5 air changes per hour, minimum.

- 2. Exhaust directly to outside.
- 3. Seal HVAC air inlets and outlets immediately after duct installation.
- E. Do not store construction materials or waste in mechanical or electrical rooms.
- F. Provide direct exhaust to the exterior during installation of strong emitting materials, including touch-up activities; keep exhaust away from intakes and occupied spaces.
- G. Provide adequate ventilation of packaged dry products prior to installations. Remove from package and place in a secure, dry, well-ventilated space, free from contaminant sources and residues. Provide a temperature range of 60 degrees F minimum to 90 degree maximum continuously during ventilations period. Do not ventilate within limits of Work unless otherwise approved by Architect.
- H. "Bake-out" or "super-heating" of spaces to accelerate the release of gaseous emissions is not permitted.
- I. Prohibit smoking and use of fossil-fueled temporary heating units inside the building and near building entrances, windows and intakes and within 25 feet of building entrances.
- J. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
 - 1. Inspect duct intakes, return air grilles, and terminal units for dust.
 - 2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
 - 3. Clean tops of doors and frames.
 - 4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
 - 5. Clean return plenums of air handling units.
 - 6. Remove intake filters last, after cleaning is complete.
- K. Use low-toxic pest control chemicals such as boron, if needed, unless otherwise directed.
- L. Remove spills or excess application of solvent-containing products as soon as possible. Use low-emitting cleaning agents, giving preference to Green Seal products.
- M. Keep work areas as dry as possible; replace any absorptive (dry sink) material that is exposed to moisture.
- N. Use other relevant recommendations of SMACNA (OCC) for avoiding unnecessary contamination due to construction procedures.

3.2 PATHWAY INTERUPTION

- A. Provide negative pressurization of spaces under construction and/or demolition and positive pressurization of occupied or finished spaces while construction work proceeds in adjacent areas.
- B. Relocate pollutant sources when project equipment or staging areas coincide with critical air flow pathways and place plastic barriers to contain construction areas.
- C. Temporarily seal building, including air intakes and exhaust vents, and any other building openings, when dust-generating or strong-emitting construction products or procedures are used on the exterior of the building.
- D. Once spaces within building become occupied, work areas must remain under negative pressure. Exhaust air at a rate at least 10% greater than the rate of supply. Do not exhaust air where it can be drawn back into occupied spaces and place a continuous plastic barriers creating a seal between construction areas and occupied spaces.

3.3 INDOOR AIR QUALITY MANAGEMENT - PRIOR TO OCCUPANCY

A. Provide Air Contaminant Testing, if testing fails, provide Building Flush-Out.

3.4 BUILDING FLUSH-OUT

- A. Perform building flush-out before occupancy, with all interior finishes installed and new filtration media in place.
- B. Do not start flush-out until:
 - 1. All construction is complete.
 - 2. HVAC systems have been tested, adjusted, and balanced for proper operation.
 - 3. Inspection of inside of return air ducts and terminal units confirms that cleaning is not necessary.
 - 4. New HVAC filtration media have been installed.
- C. Building Flush-Out: Operate all ventilation systems at normal flow rates with 100 percent outside air until a total air volume of 14,000 cubic feet per square foot of floor area has been supplied.
 - 1. Obtain Owner's concurrence that construction is complete enough before beginning flush-out.
 - 2. Maintain interior temperature of at least 60 degrees F and interior relative humidity no higher than 60 percent.
 - 3. If additional construction involving materials that produce particulates or any of the specified contaminants is conducted during flush-out, start flush-out over.
 - 4. Space may be occupied following delivery of a minimum of 3,500 cubic feet of outside air per square feet of floor area to space, until the total of 14,000 cubic feet per square foot of outside air has been delivered to the space, and:
 - a. Begin ventilation at least three hours prior to daily occupancy.
 - b. Continue ventilation during all occupied periods.
 - c. Provide minimum outside air volume of 0.30 cfm per square foot or design minimum outside air rate, whichever is greater.
 - 5. Do not start flush-out in any area until:
 - a. All construction is complete.
 - b. HVAC systems have been tested, adjusted, and balanced for proper operation.
 - c. Inspection of inside of return air ducts and terminal units confirms that cleaning is not necessary.
 - d. New HVAC filtration media have been installed.
- D. Install new HVAC filtration media after completion of flush-out and before occupancy or further testing.

3.5 AIR CONTAMINANT TESTING

- A. Perform air contaminant testing before occupancy.
- B. Do not start air contaminant testing until:
 - 1. All construction is complete, including interior finishes.
 - 2. HVAC systems have been tested, adjusted, and balanced for proper operation.
 - 3. Cleaning of inside of HVAC ductwork, specified elsewhere, has been completed.
 - 4. New HVAC filtration media have been installed.
- C. Indoor Air Samples: Collect from spaces representative of occupied areas:

- 1. Collect samples while operable windows and exterior doors are closed, HVAC system is running normally as if occupied, with design minimum outdoor air, but with the building unoccupied.
- 2. Collect samples from spaces in each contiguous floor area in each air handler zone, but not less than one sample per 25,000 square feet; take samples from areas having the least ventilation and those having the greatest presumed source strength.
- 3. Collect samples from height from 36 inches to 72 inches above floor.
- 4. Collect samples from same locations on 3 consecutive days during normal business hours; average the results of each set of 3 samples.
- 5. Exception: Areas with normal very high outside air ventilation rates, such as laboratories, do not need to be tested.
- 6. For each sampling point where maximum concentration limits are exceeded conduct flush-out with outside air and retest the specific parameter(s) that were exceeded to indicate the requirements are achieved; repeat procedure until all requirements have been met.
- 7. When retesting the same building areas, take samples from at least the same locations as in first test.
- D. Outdoor Air Samples: Collect samples at outside air intake of each air handler at the same time as indoor samples are taken.
- E. Analyze air samples and submit report.
- F. Air Contaminant Concentration Limits:
 - 1. Formaldehyde: Not more than 27 parts per billion.
 - 2. PM10 Particulates: Not more than 50 micrograms per cubic meter.
 - 3. Total Volatile Organic Compounds (TVOCs): Not more than 500 micrograms per cubic meter.
 - 4. Chemicals Listed in CAL (CDPH SM) Table 4-1, except Formaldehyde: Allowable concentrations listed in Table 4-1.
 - 5. Carbon Monoxide: Not more than 9 parts per million and not more than 2 parts per million higher than outdoor air.
- G. Air Contaminant Concentration Test Methods:
 - 1. Formaldehyde: ASTM D5197, EPA 625 Method TO-11A, or EPA 600 Method IP-6.
 - 2. Particulates: EPA 600 Method IP-10.
 - 3. Total Volatile Organic Compounds (TVOC): EPA 625 Method TO-1, TO-15, or TO-17; or EPA 600 Method IP-1.
 - 4. Chemicals Listed in CAL (CDPH SM) Table 4-1, except Formaldehyde: ASTM D5197, or EPA 625 Method TO-1, TO-15, or TO-17.
 - 5. Carbon Monoxide: EPA 600 Method IP-3, plus measure outdoor air; measure in ppm; report both indoor and outdoor measurements.

SECTION 01 58 13 - TEMPORARY PROJECT SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project identification sign.
- B. Project informational signs.

1.2 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements for submittal procedures.
- B. Shop Drawing: Show content, layout, lettering, color, foundation, structure, sizesand grades of members.

PART 2 PRODUCTS

2.1 PROJECT IDENTIFICATION SIGN

A. One painted sign of construction, design, and content shown on Drawings, location designated.

2.2 PROJECT INFORMATIONAL SIGNS

- A. Provide signs designation construction access at entrances designated for construction access.
- B. Provide no trespassing and hard hat area signs.
- C. Provide sign delineating areas of separation of school and construction zones.
- D. Provide signs designating locations of access to existing school portion of the site for use by ongoing school related activities.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.

3.2 MAINTENANCE

A. Maintain signs and supports clean, repair deterioration and damage.

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

1.3 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 45 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. 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.
- C. 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.
- D. 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.
- E. LEED Submittals: Use forms provided in Section 01 35 17.

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the 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. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Where all other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 61 16.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.
 - 3. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 4. Have longer documented life span under normal use.
 - 5. Result in less construction waste.
 - 6. Are made of vegetable materials that are rapidly renewable.
 - 7. Have a published GreenScreen Chemical Hazard Analysis.
- C. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
- D. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- E. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

2.3 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products of Named Manufacturers: Contractor to provide products from named manufacturers; refer to other provisions regarding substitutions.
- C. Or Equal Product: Product that is demonstrated and approved through submittal process, as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- D. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

2.4 MAINTENANCE MATERIALS

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

PART 3 EXECUTION

3.1 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Timing: Architect will not consider requests for substitution after defined time period, except for extenuating circumstances described below; requests may be considered or rejected at discretion of Architect.
 - 1. The specification permits "Or Equal."
 - 2. The product is no longer manufactured.
 - 3. The product is not available due to a strike.
 - 4. The specified product is identified as incompatible or inappropriate for the project.
 - 5. The specified item fails to comply with building code requirements.
 - 6. The manufacturer or fabricator declares a specified product to be unsuitable for the use intended and refuses to warrant its installation.
 - 7. Significant cost savings to the Owner.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
 - 1. Statement indicating why specified material or product cannot be provided.
 - 2. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - 3. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - 5. Samples, where applicable or requested.
 - 6. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - 7. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 8. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - 9. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - 10. Cost information, including a proposal of change, if any, in the Contract Sum.
 - 11. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

- 12. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- D. A request for substitution 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.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
 - 3. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 4. Architect will consider Contractor's request for substitution when the following conditions are met. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Substitution requested must meet or exceed specified material, product or equipment items appearance, function and quality level as determined by the Architect and Owner.
 - b. Requests for substitution must include clear identification of the material, product or equipment item and complete description including drawings, cuts, performance and test data, along with any other information necessary for a complete evaluation.
 - c. Requested substitution shall not require extensive revisions to the Contract Documents or changes to any other materials, products or equipment items.
 - d. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - e. Substitution request is fully documented and properly submitted.
 - f. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - g. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - h. Requested substitution is compatible with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. Requested substitution will not delay the Work.
 - k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - 1. The Architect's/Owner's decision to accept or reject the proposed substitution shall be final and will be set forth in writing.

- G. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later. Architect's notification will be in one the following forms:
 - 1. Form of Acceptance:
 - a. After Contract signing: Change Order.
 - 2. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

3.2 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.

3.3 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. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 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 weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- J. Prevent contact with material that may cause corrosion, discoloration, or staining.
- K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- L. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.



SUBSTITUTION REQUEST

Project:	Substitution Request Number:
	From:
To:	Date:
	A/E Decised Neuroles and
Re:	Contract From
Specification Title:	
Section: Page:	Article/Paragraph:
Proposed Substitution:	
Manufacturer: Phone:	
Trade Name:	Model No.:
Installer: Address:	Phone:
History: ☐ New product ☐ 2-5 years old ☐ 5-10 y	yrs old
Differences between proposed substitution and specified pro	oduct:
Point-by-point comparative data attached - REQUIRED	BY A/E
Reason for not providing specified item:	
Similar Installation: See attached "Project List"	
·	Architect:
	Owner:
	Date Installed:
Proposed substitution affects other parts of Work:	□ No □ Yes; explain
Savings to Owner for accepting substitution:	(\$
Proposed substitution changes Contract Time: No	Yes [Add] [Deduct]days
	v
Supporting Data Attached: Drawings Produc	ct Data
	Upon request

SUBSTITUTION REQUEST

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

 Coordination, instal 	lation, and changes in	the Work as necessary	for accepted sul	bstitution will be comp	plete in all resp	ects.
Submitted by:						
Signed by:						
Firm:						
Address:						
Telephone:						
Attachments:						
	d - Make submittals in d as noted - Make sub- - Use specified materi	accordance with Specif mittals in accordance wi als. e specified materials.			Date:	
Additional Comments:	☐ Contractor	Subcontractor [Supplier	☐ Manufacturer	☐ A/E ☐]

SECTION 01 61 16 - VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Low-emitting restrictions for product categories listed below under "DEFINITIONS."
- B. VOC-restricted products.
- C. All products of each category that are installed in the project must comply; Owner's project goals do not allow for partial compliance.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

1.3 DEFINITIONS

- A. Low-Emitting Products: All products of each of the following categories when installed or applied on-site in the building interior:
 - 1. Adhesives, sealants, and sealer coatings.
 - 2. Carpet tile.
 - 3. Resilient floor coverings.
 - 4. Paints and coatings.
 - 5. Insulation.
 - 6. Gypsum board.
 - 7. Acoustical ceilings and panels.
 - 8. Cabinet work.
 - 9. Wall coverings.
 - 10. Composite wood and agrifiber products used either alone or as part of another product.
- B. Interior of Building: Within the building waterproofing envelope.
- C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.4 REFERENCE STANDARDS

A. CRI (GLP) - Green Label Plus Testing Program - Certified Products; www.carpet-rug.org; current edition.

1.5 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Evidence of Compliance: Submit for each different product in each applicable category.
 - 1. Identify evidence submittals with the words "LEED Report".
- C. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
 - 1. Adhesives, sealants, paints and coatings: VOC content as measured in grams per Liter (g/L).

PART 2 PRODUCTS

2.1 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. Adhesives applied within the building waterproofing envelope shall comply with the current VOC Content limits, as expressed in grams per liter, of South Coast Air Quality Management District (SCAQMD) Rule 1168 "Adhesive and Sealant Applications," amended January 7, 2005, or more stringent levels, as follows:
 - 1. Indoor Carpet & Pad Adhesives: 50.
 - 2. Wood Flooring Adhesive: 100.
 - 3. Rubber Floor Adhesives: 60.
 - 4. Subfloor Adhesives: 50.
 - 5. Ceramic Tile Adhesives: 65.
 - 6. VCT and Asphalt Tile (& Linoleum) Adhesives: 50.
 - 7. Dry Wall and Panel Adhesives: 50.
 - 8. Cove Base Adhesives: 50.
 - 9. Multipurpose Construction Adhesives: 70.
 - 10. Structural Glazing Adhesives: 100.
 - 11. PVC Welding: 510.
 - 12. CPVC Welding: 490.
 - 13. ABS Welding: 325.
 - 14. Plastic Cement Welding: 250.
 - 15. Adhesive Primer for Plastic: 550.
 - 16. Contact Adhesive: 80.
 - 17. Special Purpose Contact Adhesive: 250.
 - 18. Structural Wood Member Adhesive: 140.
 - 19. Metal to metal substrates: 30.
 - 20. Plastic foam substrate: 50.
 - 21. Porous substrate except wood: 50.
 - 22. Wood substrate: 30.
 - 23. Fiberglass substrate: 80.
 - 24. All Other Welding & Installation Adhesives: 250.
- C. Aerosol Adhesives applied within building waterproofing envelope shall comply with the VOC Content limits, as expressed in percentage of VOCs by weight, of Green Seal (GS) Standard GS-36 "Commercial Adhesives," October 19, 2000 as follows:
 - 1. General Purpose Mist Spray: 65% VOCs by weight.
 - 2. General Purpose Web Spray: 55% VOCs by weight.
 - 3. Special Purpose Aerosol Adhesives (all types): 70% VOCs by weight.
- D. Sealants applied within building waterproofing envelope shall comply with VOC Content limits, as expressed in grams per liter, less water and exempt compounds, of SCAQMD Rule 1168 "Adhesive and Sealant Applications," amended January 7, 2005, as follows:
 - 1. Architectural Sealants: 250.
 - 2. Non-membrane Roof: 300.
 - 3. Single-Ply Roof Membrane: 450.
 - 4. Other: 420.

- E. Sealant primers applied within building waterproofing envelope shall comply with VOC Content limits, as expressed in grams per liter, less water and exempt compounds, of SCAQMD Rule 1168 "Adhesive and Sealant Applications," amended January 7, 2005, as follows:
 - 1. Architectural, Nonporous: 250.
 - 2. Architectural, Porous: 775.
 - 3. Other: 750.

F. Paints and Coatings:

- 1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
- 2. Credit EQ 4.2: VOC limits.
 - a. Flat Paints, Coatings, and Primers: VOC not more than 50 g/L.
 - b. Non-Flat Paints, Coatings, and Primers: VOC not more than 150 g/L.
 - c. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than $250~{\rm g/L}$.
 - d. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
 - e. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
 - f. Floor Coatings: VOC not more than 100 g/L.
 - g. Shellacs, Clear: VOC not more than 730 g/L.
 - h. Shellacs, Pigmented: VOC not more than 550 g/L.
 - i. Stains: VOC not more than 250 g/L.
 - j. Flat Interior Topcoat Paints: VOC not more than 50 g/L.
 - k. Non-Flat Interior Topcoat Paints: VOC not more than 150 g/L.
 - l. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than $250~{\rm g/L}$.
 - m. Clear Wood Finishes, Varnishes and Sanding Sealers: VOC not more than 350 g/L.
 - n. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
 - o. Primers, Sealers, and Undercoaters: VOC not more than 200 g/L.
 - p. Dry-Fog Coatings: VOC not more than 400 g/L.
 - q. Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L.
 - r. Pretreatment Wash Primers: VOC not more than 420 g/L.
 - s. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 - t. Restricted Components: Paints and coatings shall not contain any of the following:
 - 1) Acrolein.
 - 2) Acrylonitrile.
 - 3) Antimony.
 - 4) Benzene.
 - 5) Butyl benzyl phthalate.
 - 6) Cadmium.
 - 7) Di (2-ethylhexyl) phthalate.
 - 8) Di-n-butyl phthalate.
 - 9) Di-n-octyl phthalate.
 - 10) 1,2-dichlorobenzene.

- 11) Diethyl phthalate.
- 12) Dimethyl phthalate.
- 13) Ethylbenzene.
- 14) Formaldehyde.
- 15) Hexavalent chromium.
- 16) Isophorone.
- 17) Lead.
- 18) Mercury.
- 19) Methyl ethyl ketone.
- 20) Methyl isobutyl ketone.
- 21) Methylene chloride.
- 22) Naphthalene.
- 23) Toluene (methylbenzene).
- 24) 1,1,1-trichloroethane.
- 25) Vinyl chloride.
- 3. 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.
- 4. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- G. Carpet Tile and Adhesive: Provide products having VOC content not greater than that required for CRI Green Label Plus certification.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Current Green Label Plus Certification.
 - b. Report of laboratory testing performed in accordance with requirements.
- H. Carpet Tile and Adhesive: Provide products having VOC content as specified in Section 09 68 13.
- I. Composite Wood and Agrifiber Products and Adhesives Used for Laminating Them: Provide products having no added urea-formaldehyde resins.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Published product data showing compliance with requirements.
- J. Other Product Categories: Comply with limitations specified elsewhere.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

SECTION 01 61 16.01 - ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM

.1	FO	RM
	A.	Identification: 1. Project Name: 2. Project No.: 3. Architect:
	В.	 Use of This Form: Because installers are allowed and directed to choose accessory materials suitable for the applicable installation, there is a possibility that such accessory materials might contain VOC content in excess of that permitted, especially where such materials have not been explicitly specified. Contractor is required to obtain and submit this form from each installer of work on this
		 project. For each product category listed, circle the correct words in brackets: either [HAS] or [HAS NOT]. If any of these accessory materials has been used, attach to this form product data and MSDS sheet for each such product.
	C.	VOC content restrictions are specified in Section 01 61 16.
1.1	PR A. B.	DDUCT CERTIFICATION I certify that the installation work of my firm on this project: 1. [HAS] [HAS NOT] required the use of any ADHESIVES. 2. [HAS] [HAS NOT] required the use of any JOINT SEALANTS. 3. [HAS] [HAS NOT] required the use of any PAINTS OR COATINGS. 4. [HAS] [HAS NOT] required the use of any COMPOSITE WOOD or AGRIFIBER PRODUCTS. Product data and MSDS sheets are attached.
2.1		Title: (Installer/Manufacturer/Supplier Firm) CTIFIED BY: (Installer/Manufacturer/Supplier Firm) Firm Name: Print Name: (officer of company)
	E.	Date:
		END OF SECTION

SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- 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.

1.2 RELATED REQUIREMENTS

- A. Section 01 50 00 Temporary Facilities and Controls: Temporary exterior enclosures.
- B. Section 01 50 00 Temporary Facilities and Controls: Temporary interior partitions.
- C. Section 07 84 00 Firestopping.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.
- C. 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. Alternatives to cutting and patching.
 - f. Effect on work of Owner or separate Contractor.
 - g. Written permission of affected separate Contractor.
 - h. Date and time work will be executed.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.4 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in the State of Maryland and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

1.5 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- C. 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.
- D. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- E. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- F. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- G. 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.

PART 2 PRODUCTS

2.1 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 60 00 Product Requirements.

PART 3 EXECUTION

3.1 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.

3.2 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.

3.3 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 four 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.
 - 3. Review conflicts and compatibility issues.
 - 4. Review environmental limitations and protection.
 - 5. Examine substrates.
 - 6. Review requirements of the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Submittals.
 - e. Mockups.
 - f. Testing and inspection.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. 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.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

3.5 GENERAL INSTALLATION REQUIREMENTS

- A. 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.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 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 shown.
 - 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 of construction specified in Section 01 50 00 in locations indicated on drawings.
 - 2. Provide sound retardant partitions of construction indicated on drawings in locations 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.
 - 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.
 - 4. Patch as specified for patching new work.
- G. 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.
- H. 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.
 - 3. Patch as specified for patching new work.
- I. Clean existing systems and equipment.
- J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- K. Do not begin new construction in alterations areas before demolition is complete.
- L. Comply with all other applicable requirements of this section.

3.7 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-conforming work.
- D. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.
- E. 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.
- F. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- H. Restore work with new products in accordance with requirements of Contract Documents.
- I. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- J. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.

K. 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.
- 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.
- L. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- M. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

3.8 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.

3.9 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. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.10 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. 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.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 ADJUSTING

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

3.12 FINAL CLEANING

- A. Employ experienced workers or professional cleaners for final cleaning; clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program.
- B. Use cleaning materials that are nonhazardous.
- 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 debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, drainage systems, and roofs.
- E. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- F. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

- G. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
- H. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
- I. Remove tools, construction equipment, machinery, and surplus material from Project site.
- J. Remove snow and ice to provide safe access to building.
- K. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- L. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- M. Sweep concrete floors broom clean in unoccupied spaces.
- N. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
- O. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
- P. Remove labels that are not permanent.
- Q. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - 2. Revise seven subparagraphs below to suit Project. Check for conflict or duplication with provisions in other Sections, particularly Divisions 20 through 29.
- R. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- S. Replace parts subject to unusual operating conditions.
- T. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- U. Clean exposed surfaces of diffusers, registers, and grills.
- V. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- W. Leave Project clean and ready for occupancy.

SECTION 01 71 23 - FIELD ENGINEERING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Requirements of the General Provisions apply to all work under this section.
- B. Baltimore City Department of Public Works Standard Details for Construction dated March 2008 and as amended.
- C. Throughout the specifications, types of materials may be specified by manufacturer's name and catalogue number in order to establish standards of quality and performance and not for the purpose of limiting competition. Alternate methods and/or materials may be submitted to the Architect for consideration. Those judged to be equal to that specified will receive written approval.

1.2 SUMMARY

Work included: Provided at the Contractor's expense, such field engineering services as are required for proper completion of the Work including, but not necessarily limited to:

- A. The Contractor shall have property lines located and marked and corners set by a certified land surveyor. Permanent corner markers shall be installed where they do not already exist.
- B. The Contractor shall be responsible for all stakeouts and elevation checks required for construction. All such Work shall be performed by a professional land surveyor. The surveyor shall verify adequacy of benchmarks before starting construction.
- C. Before the start of any building construction, the Contractor shall have a professional land surveyor locate and stake building corners, driveway entrances, driveways, parking areas and playfields. If there are any discrepancies between the actual layout and the project site plan, they shall be brought to the attention of the Architect and resolved before Work proceeds. A building and site stake out drawing stamped and signed by a professional land surveyor may be submitted in lieu of this preliminary stake out.
- D. After the corners of the exterior walls have been started, the Contractor shall obtain a wall check survey certificate made by a professional land surveyor. This survey shall show the accurate location of the building with reference to property lines.
- E. After the first sections of slab-on-grade have been placed in the school building, the Contractor shall have a professional land surveyor verify and record the finish floor elevation on the wall check survey.
- F. At the end of the project, the Contractor shall have a professional land surveyor prepare an asbuilt survey showing the accurate horizontal and vertical locations of all building corners, paved areas, sidewalks, utilities, fencing, site walls stormwater management facilities in accordance with the requirements of Baltimore City, etc. located within the project area.

1.3 RELATED WORK:

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
- B. Additional requirements for field engineering also may be described in other Sections of these Specifications.

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.5 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300-Submittals.
- B. Upon request of the Architect, submit;
 - 1. Data demonstrating qualifications of persons proposed to be engaged for field Engineering services.
 - 2. Documentation verifying accuracy of field engineering work.
 - 3. Certifications, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance with requirements of the Contract Documents.

1.6 PROCEDURES

- A. In addition to procedures directed by the Contractor for the proper performance of the Contractor's responsibilities:
 - 1. Locate and protect control points before starting Work on the site.
 - 2. Preserve permanent reference points during process of the Work.
 - 3. Do not change or relocate reference points or items of the Work without specific approval from the Architect.
 - 4. Promptly advise the Architect when a reference point is lost or destroyed, or requires relations because of other changes in the Work.
 - a) Upon direction of the Architect, require the field engineer to replace reference stakes or markers.
 - b) Locate such replacements according to the original survey control.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

Not Applicable

END SECTION

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Diversion Requirements shall be as follows:
 - 1. A minimum of 75% of total land clearing debris and the following project waste shall be diverted from the landfill. The following categories, at a minimum, shall be diverted from landfill:
 - a. Clean dimensional wood, and palette wood.
 - b. Plywood, OSB, and particle board.
 - c. Concrete.
 - d. Bricks.
 - e. Concrete Masonry Units (CMU).
 - f. Asphaltic Concrete.
 - g. Cardboard, paper, packaging.
 - h. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - i. Gypsum Drywall (unpainted).
 - j. Paint.
 - k. Glass.
 - l. Plastics.
 - m. Carpet & Pad.
 - n. Beverage Containers.
- E. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be tracked and reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- F. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01 35 15 Sustainable Design Requirements.

- C. Section 01 50 00 Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- D. Section 01 60 00 Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- E. Section 01 70 00 Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.
- F. Section 02 41 00 Demolition: Handling and disposal of demolished building materials.
- G. Section 31 10 00 Site Clearing: Handling and disposal of land clearing debris.

1.3 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. LEED Online: Complete LEED Template including the amount of recycled and salvaged construction and demolition waste to date for both demolition and new work.
 - 3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 4. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
 - 5. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards.
 - c. Include weight tickets as evidence of quantity.
 - 6. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.
- C. Final Waste Management Documentation: Submit at completion of Substantial Completion and prior to contract closeout:
 - 1. All information required in Monthly Report Submittals.
 - 2. Legible copies of on-site logs, manifests, weight tickets, and receipts.
 - 3. Final LEED Template uploaded to LEED Online, including appropriate documentation of total amount (by weight or volume) of diverted construction and demolition waste, and the total amount (by weight or volume) of landfilled waste excluding site clearing.
 - a. MR Credit 2, Construction Waste Management.

PART 2 PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

- A. See Section 01 60 00 Product Requirements for substitution submission procedures.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 60 00:
 - 1. Relative amount of waste produced, compared to specified product.

- 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
- 3. Proposed disposal method for waste product.
- 4. Markets for recycled waste product.

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Pre-bid meeting.
 - 2. Pre-construction meeting.
 - 3. Regular job-site meetings.
- E. Records: Maintain onsite logs for each load of materials removed from site:
 - 1. Landfill Log: Include type of material, load (by weight or volume), recycling/hauling service, date accepted by landfill, and facility fee.
 - 2. Waste Diversion: Include type of material, load (by weight or volume), recycling/hauling service, date accepted by recycling service, or non-profit receiver and facility fee.
 - 3. Where comingling occurs prior to collection, track the amount of construction waste diverted from landfill based on the weight or volume of the removed co-mingled waste and provide the documentation of percentages of recycled from the sorting facility.
- F. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers as required.
 - 2. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
 - 3. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
 - 4. Locate enclosures out of the way of construction traffic.
 - 5. Provide adequate space for pick-up and delivery and convenience to subcontractors.

- 6. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
- 7. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- 8. Provide bi-lingual signage.
- G. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- H. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
 - 1. Coordinate work of recycling, composting and salvaging waste haulers with other trades.
 - 2. Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- I. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- J. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.

1.2 RELATED REQUIREMENTS

A. Section 01 20 00 - Payment Procedures.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.
 - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 11. Advise Owner of changeover in heat and other utilities.
 - 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 13. Complete final cleaning requirements, including touchup painting.
 - 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Submit a final Application for Payment according to Division 1 Section "Price and Payment Procedures."
 - Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 4. Submit pest-control final inspection report and warranty.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION



PUNCH LIST

Project:					From (A/E):				
To (Contractor):					A/E Project Nu	mber:			
The following items require th responsibility of the Contractor					st may not be all-	inclusive, and the fai	lure to include any	items on this list	does not alter the
Item Room Location Number Number (Area)	Des	scription					Correct Date	tion/Completion	Verification A/E Check
☐ Attachments									
Signed by:								Date:	
Copies: Owner	Consultants		🗆	🗆	🗆	🗆	🗆	🗆	File

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

1.3 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 six 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

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.

- 5. Reviewed shop drawings, product data, and samples.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 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.

3.2 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.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. 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.
- 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.

3.4 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. 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.
- D. 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.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Provide control diagrams by controls manufacturer as installed.
- J. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- K. Lamp Submittal: Include data on all lamps labeled according to fixture type; this data shall include:
 - 1. Manufacturer.
 - 2. Lamp designation (ex. PAR38, M16, T5HO).
 - 3. Manufacturer's catalog number.
 - 4. Wattage.
 - 5. Color temperature.
 - 6. CRI.
 - 7. Beam spread.
 - 8. Initial lumens.
 - 9. Catalog spec sheet for each fixture type.
- L. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. 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.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.
- E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractorand subcontractors, with names of responsible parties.

- H. 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.
- I. 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.
- J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- L. 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. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.
- M. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- N. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
- O. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- P. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.6 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 the 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 79 00 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections; comply with pertinent LEED requirements.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems and equipment.
 - 5. Security and audio visual systems.
 - 6. Conveying systems.
 - 7. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes, ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Items specified in individual product Sections.

1.2 RELATED REQUIREMENTS

A. Section 01 74 19 - Construction Waste Management and Disposal.

1.3 SUBMITTALS

- A. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
 - 1. Format: DVD Disc.
 - 2. Label each disc and container with session identification and date.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable.

- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
- F. Coordinate demonstration and training requirements with commissioning requirements.

END OF SECTION

SECTION 01 91 13 - COMMISSIONING REQUIREMENTS

1. GENERAL

A. SUMMARY

Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

B. RELATED SECTIONS:

- 1. Division 22 Section "COMMISSIONING REQUIREMENTS" for commissioning process activities for plumbing systems, assemblies, equipment, and components.
- 2. Division 23 Section "HVAC COMMISSIONING" for commissioning process activities for HVAC&R systems, assemblies, equipment, and components.
- 3. Division 26 Section "ELECTRICAL COMMISSIONING" for commissioning process activities for electrical systems, assemblies, equipment, and components.

2. DEFINITIONS

- A. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- C. CxA: Commissioning Authority.
- D. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

3. COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:

- 1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
- 2. Representatives of the facility user and operation and maintenance personnel.
- 3. Architect and engineering design professionals.

C. OWNER'S RESPONSIBILITIES

- 1. Provide the OPR documentation to the CxA and Contractor for information and use. CxA will assist owner in the creation of OPR if needed.
- 2. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.
- 3. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

D. CONTRACTOR'S RESPONSIBILITIES

- 1. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
 - a. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - b. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
 - c. Attend commissioning team meetings held on a monthly basis until 20% of equipment has been started or is ready to start. Meetings will be bi-weekly from that point on.
 - d. Integrate and coordinate commissioning process activities with construction schedule.
 - e. Complete electronic construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.
 - f. Review and accept commissioning process test procedures provided by the Commissioning Authority.
 - g. Complete commissioning process test procedures.

E. CxA'S RESPONSIBILITIES

- 1. Organize and lead the commissioning team.
- 2. Provide commissioning plan.
- 3. Convene commissioning team meetings.
- 4. Provide Project-specific construction checklists and commissioning process test procedures.
- 5. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not

limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.

- 6. Prepare and maintain the Issues Log.
- 7. Prepare and maintain completed construction checklist log.
- 8. Witness systems, assemblies, equipment, and component startup.
- 9. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

END OF SECTION

SECTION 02 30 00 - SUBSURFACE DRILLING AND SAMPLING INFORMATION

PART 1 GENERAL

- 1.1 The following information is included in the Project Manual for bidders' use in preparing bids, but is not part of the Contract Documents, and does not relieve the bidders from doing their own investigation to determine the accuracy of the information.
 - A. Report of Subsurface Exploration, Laboratory Testing and Geotechnical Engineering Analyses, Holabird PK-8 School, Baltimore, Maryland, project no. 8153; dated July 29, 2016.

1.2 STATEMENT CONCERNING THE BORING DATA

- A. The test borings and samples of the soils encountered were obtained by the Architect to assist the Architect and his consultants in determining the type and design of the foundation systems.
- B. The test borings were made by ECS Mid-Atlantic, LLC, in accordance with their system of soils classification and they, ECS Mid-Atlantic, LLC, neither the Owner, the Architect, or his consultants guarantee the accuracy or consistency of the information contained within the Geotechnical Report with the actual site conditions.
- C. Any radical deviation from the anticipated material, as indicated by the borings, during the excavation for the building should be reported to the Architect immediately and confirmed in writing.

1.3 CONFIRMATION OF BORING DATA

- A. Bidders, Contractors, and any others who are concerned with, or are affected by the test borings should make their own borings and tests at the site.
- B. No additional compensations will be allowed the Contractor for failure to fully investigate the site or for the neglect of the information contained in the Boring Logs.

1.4 ATTACHMENT

A. Report of Subsurface Exploration, Laboratory Testing and Geotechnical Engineering Analyses, Holabird PK-8 School, Baltimore, Maryland, project no. 8153; dated July 29, 2016.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



REPORT OF SUBSURFACE EXPLORATION, LABORATORY TESTING AND GEOTECHNICAL ENGINEERING ANALYSES

Holabird PK-8 School Baltimore, Maryland ECS Project No. 8153

Prepared For

GRIMM AND PARKER ARCHITECTS 11720 BELTSVILLE DRIVE, SUITE 600 CALVERTON, MARYLAND 20705

July 29, 2016

Geotechnical · Construction Materials · Environmental · Facilities

July 29, 2016

Mr. Paul Bradshaw Grimm and Parker Architects 11720 Beltsville Drive, Suite 600 Calverton, MD 20705

ECS Project No. 02-8153

Reference: Report of Subsurface Exploration, Laboratory Testing and Geotechnical

Engineering Analyses, Holabird PK-8 School, 1500 Imla Street, Baltimore,

Maryland

Dear Mr. Bradshaw:

ECS Mid-Atlantic, LLC (ECS) has completed the geotechnical investigation for the abovereferenced project. This work was performed in accordance with our proposal No. 02-16822-PR, dated June 16, 2016. This report contains a discussion of our current understanding of the proposed development, the subsurface exploration procedures employed, the exploration and laboratory test results, and our recommendations for the design and construction of the geotechnical aspects of the proposed building.

It has been our pleasure to be of service to Grimm and Parker Architects on this project. We would appreciate the opportunity to continue our role as Geotechnical Engineer of Record during final design and subsequent construction. If you have any questions with regard to the information contained in the enclosed report, or if we can be of further assistance to you during the planning or construction phases of the project, please contact us.

Most sincerely.

ECS MID-ATLANTIC, LLC

wn M. Appelbaum, P.E. Senior Project Engineer

Principal E

Professional Certification I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No <u>29553</u>. Expiration Date: <u>12/31/2017</u>

REPORT OF SUBSURFACE EXPLORATION, LABORATORY TESTING AND GEOTECHNICAL ENGINEERING ANALYSES

Holabird PK-8 School Baltimore, Maryland ECS Project No. 8153

Prepared for:

GRIMM AND PARKER ARCHITECTS 11720 BELTSVILLE DRIVE, SUITE 600 CALVERTON, MARYLAND 20705

Submitted by:

ECS Mid-Atlantic, LLC 1340 Charwood Road, Suite A Hanover, Maryland 21076-3117

July 29, 2016

HOLABIRD PK-8 SCHOOL

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APPENDIX

HOLABIRD PK-8 SCHOOL

INTRODUCTION

Project Location

The site is located at 1500 Imla Street in the City of Baltimore, Maryland. A Site Location Diagram, depicting the approximate location of the project site, is provided in the Appendix.

Project and Site Description

Our understanding of the project is based on the information provided to us in your email on June 7, 2016, which included a *Geotechnical Services Request for Proposal* (RFP) dated June 6, 2016, as well as a Site Plan (Sheet A-0.5H, as prepared by Grimm and Parker Architects and dated May 25, 2016) and a Boring Location Plan (dated April 26, 2016). The provided plans depicted the existing and proposed concept, as well as the requested soil boring locations and depths.

The project site is currently occupied by an existing school building and associated drive lanes, parking areas, play field and basketball court. Based on the provided information, we understand that the proposed construction consists of the demolition of the existing school building to allow for the construction of a new school. We understand that the new school will consist of an approximately 89,000 SF building with a two-story academic wing and a single story double-height space for gymnasium, cafeteria and associated spaces.

The RFP also indicated that five (5) areas are being considered for stormwater management (SWM) facilities. Specific details regarding the planned SWM facilities were not provided at the time this report was prepared; however, we anticipate that facility bottoms will be less than 10 ft below existing grades and that infiltration is desirable.

The provided plan indicates that the site grades generally slope downwards from west to east, with grades ranging from approximately EL 100 at the northwest corner of the site along Cardiff Avenue to EL 66 in the southeast corner of the site near the intersection of Imla Street and Danville Avenue. However, site grades within the new school footprint generally range from approximately EL 80 to EL 90. Final grading information was not provided at the time this report was prepared; however, we have assumed that cuts and fill of 3 ft or less will be required to establish planned grades.

Structural loading information was not provided at the time this report was prepared; however, based on our previous experience with similar structures, we anticipate that maximum column loads will range from 200 kips to 400 kips, and wall loads will be on the order of 10 kips per foot.

Scope of Services

Our scope of services included drilling nineteen (19) soil borings in general accordance with ASTM D 1586 standards. The borings are distributed as follows: Borings B-1 through B-14 were drilled to evaluate subsurface conditions for the planned building; and Borings SWM-1 through SWM-5 were drilled to evaluate subsurface conditions for the planned SWM facilities. The borings were drilled to depths ranging from 15 ft to 25 ft below existing grades.

The scope of services also included performing classifications of the recovered soil samples in our laboratory, performing limited laboratory testing of selected samples, conducting various engineering analyses, and providing this report. This report contains the following information.

- a. Information regarding site conditions, including surface drainage, geology, and special site features;
- b. Descriptions of the field exploration and laboratory testing procedures used;
- c. Boring logs in accordance with the standard practice of geotechnical engineers, showing subsurface strata and descriptions, groundwater conditions, and results of field tests;
- d. A Site Vicinity Map, a Boring Location Plan, and pertinent Reference Sheets;
- e. Recommendations for allowable bearing pressure for conventional spread footing foundations and estimates of predicted foundation settlement;
- f. Evaluation of the subsurface profile to provide recommendations for the seismic soil site classification per IBC 2012;
- g. Recommendations for slab-on-grade construction, including subgrade improvements, as required;
- h. Recommendations for lateral earth pressures likely to develop on site retaining walls and below-grade walls, and perimeter drainage systems for below-grade walls;
- i. Recommendations for pavement design and construction based on estimated CBR value and traffic loading; and
- j. Evaluations and recommendations for geotechnical aspects of design and construction for the SWM facilities.

EXPLORATION PROCEDURES

Subsurface Exploration Procedures

The soil borings were drilled with an ATV-mounted drill rig, using rotary drilling methods and continuous-flight, hollow-stem augers to advance the boreholes. Drilling fluid was not used during advancement of the boreholes. The boring locations were staked in the field by ECS referencing existing site features and ground surface elevations at the boring locations were interpolated from the provided site plan.

Representative soil samples were obtained by means of the split-barrel sampling procedure in general accordance with ASTM D 1586. In the soil sampling procedure, a 2-inch O.D. split-barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer

falling 30 inches. The number of hammer blows required to drive the sampler through the final 12-inch interval is termed the Standard Penetration Test (SPT) value, blow count, or N-value, and is indicated for each sample on the Boring Logs, contained in the Appendix of this report.

N-values derived from the Standard Penetration Test procedure can be used to provide indications of the in-place relative densities of granular soil types and, in a less reliable way, of the in-place consistencies of cohesive soil types. The indications of relative densities and consistencies are qualitative, since many factors can influence N-values and prevent direct correlations, including differences among drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies. In addition, N-values from Standard Penetration Tests performed in fine-grained granular soils below groundwater levels sometimes can result in erroneous information regarding the in-situ conditions of those soils.

A field log of the subsurface conditions encountered in each boring was maintained by the Drill Crew during the drilling operations. After recovery, each boring sample was removed from the sampler and visually classified. Representative portions of the soil samples were then sealed in glass jars and returned to the ECS laboratory for further examination and possible laboratory testing. The subsurface conditions encountered at the site are further discussed in a later section of this report.

Laboratory Testing Program

The laboratory testing program included visual classifications of all soil samples by an experienced geotechnical engineer. The classifications were based on texture and plasticity in accordance with the Unified Soil Classification System (USCS). A brief explanation of the USCS is included in the Appendix of this report. The USCS group symbol for each soil type is indicated in parentheses following the soil descriptions on the boring logs. The various soil types were grouped into the major zones (strata) noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate. In situ, these transitions will likely be gradual.

The limited laboratory testing program included moisture content, Atterberg Limits, percent passing the No. 200 sieve and USDA gradation on selected boring samples to estimate engineering properties of the soils and to help verify the visual classifications. The results of the laboratory testing are included in the Appendix of this report.

The soil samples will be retained in our laboratory for a period of 60 days, after which, the samples will be discarded unless other instructions are received as to the disposition.

EXPLORATION RESULTS

Geologic Conditions

The project site is generally located within the Coastal Plain Physiographic Province. The Coastal Plain Physiographic Province is characterized by river sediments deposited during successive periods of fluctuating river level and moving shorelines. Generally, the sediments

thicken from west to east, towards the Atlantic Ocean. The uppermost sediments are often comprised of interbedded sands, gravels, clays, and silts. The Coastal Plain soils are in turn underlain by residual Piedmont soils and parent bedrock associated with the Baltimore Gneiss formation.

Based on our review of the *Geologic Map of the Baltimore East Quadrangle, Maryland*, 1979, the geologic formation underlying the site consists of the clay facies of the Patapsco Formation (Kpc), which is described as buff, red-yellow and brown mottled kaolinitic clays with variable amounts of quartz sand and silt as pods and interbeds or disseminated throughout the clay.

Subsurface Conditions

In general, the subsurface conditions encountered during our field exploration consisted of 4 inches to 8 inches of topsoil or 3 inches to 6 inches of asphalt and 5 inches to 8 inches of gravel base, overlying existing fill and natural soils. A brief description of the soils encountered is presented below.

Existing fill materials were encountered below the surficial materials in Borings B-14, SWM-3 and SWM-5. The existing fill encountered generally consisted of medium stiff to stiff cohesive soils or loose granular soils and extended to depths ranging from approximately 3 ft to 8 ft below existing grades.

Natural soils were encountered below the surficial materials or existing fill in all borings. The natural soils generally red/reddish brown in color and consisted of Silty SAND (SM), Clayey SAND (SC), SILT (ML), Sandy SILT (ML), Clayey SILT (ML), CLAY (CL) and Silty CLAY (CL). N-values recorded in the granular natural soils were noted to range from 11 blows per foot (bpf) to 32 bpf, indicating medium dense to dense relative densities. N-values recorded in the cohesive natural soils were noted to range from 6 bpf to greater than 50 bpf, indicating medium stiff to very hard consistencies. The general subsurface profile for the school building area consisted of medium stiff or stiffer cohesive soils.

More detailed descriptions of the encountered subsurface conditions are provided on the boring logs in the Appendix.

Water Level Observations

Groundwater level observations were made in each of the boreholes during the drilling operations and at completion of drilling operations, both before and after removal of the drilling augers. Groundwater was only encountered during drilling in Boring B-12 at a depth of approximately 22 ft below existing grade, or EL 58. After removal of drilling augers, Boring B-12 was dry to the cave-in depth. Cave-in levels for the open boreholes were observed during water level observations in the various borings, following removal of the drilling augers. After completion, cave-in depths were measured in the borings and ranged from approximately 11.8 ft to 22.9 ft below existing grades. The groundwater levels and the cave-in levels for each boring are shown on the Boring Logs presented in the Appendix.

The absence or presence of groundwater in the borings reflects the conditions at the time of the subsurface exploration <u>only</u>. Fluctuations in the locations of groundwater tables or the presence of perched water levels could occur as a result of seasonal variations in evaporation, precipitation, surface water run-off, and other factors. Therefore, water levels at future times could vary from those observed at the time of the borings.

ANALYSES AND EVALUATIONS

Building Foundations

Final grading information for the school building was not provided at the time this report was prepared; however, we have assumed that cuts and fill of 3 ft or less will be required to establish planned grades. Based upon the results of the borings and our understanding of the anticipated construction, it is ECS' opinion that conventional footings can be used for support of the planned school building.

The subsurface conditions in the planned school building area were evaluated with Borings B-1 through B-14. Based on the boring results, existing fill was encountered in Boring B-14 below the asphalt and gravel base and extended to a depth of approximately 3.0 ft below existing grades. The existing fill encountered in the boring generally consisted of medium stiff cohesive soils and appears to be suitable to directly support foundations and new fill. The existing fill should be thoroughly proofrolled prior to foundation or slab construction and prior to placement of any additional fill to verify the suitability of the possible fill. The proofrolling should be observed by a qualified representative of the Geotechnical Engineer in order to make final evaluations of the suitability of the possible fill to remain in place. If any possible fill soils are found to be soft or contain excessive amounts of organics, this unsuitable fill should be removed and replaced.

Foundation Considerations

Based on the boring results, the soils at the footing subgrades are anticipated to consist of approved existing fill, firm natural soils, or new engineered fill material placed on approved existing fill or firm natural soil.

Based on our understanding of the proposed construction and the results of the subsurface exploration, the proposed building can be supported on conventional footings placed on approved existing fill, firm natural soils, or new engineered fill material placed on approved existing fill or firm natural soil. ECS recommends that new footings for the proposed buildings be designed utilizing a net allowable soil bearing pressure not to exceed 4,000 pounds per square foot (psf). The net allowable soil bearing pressure refers to the pressure that can be transmitted to the foundation bearing soils in excess of the final overburden pressure at the base of a footing.

Prior to the placement of reinforcement and concrete for footings, the bases of the footing excavations should be observed, tested, and approved by a qualified representative of the Geotechnical Engineer to verify that soil conditions at each footing location are suitable for the design bearing pressure. If soft or unsuitable soils are encountered at planned subgrade levels for any footing, the unsuitable soils should be undercut down to suitable bearing materials. The footing can then be directly supported on competent suitable soils at a greater depth or, alternatively, the design footing bearing level can be restored through placement of lean concrete or engineered granular fill materials. If the design bearing level is restored using granular engineered fill, then the excavation to remove the unsuitable soils should extend at least 0.5 ft laterally beyond the bottom edges of the footing for each 1 ft of vertical undercut below the footing bearing level. The engineered granular fill materials should be placed and compacted as discussed in a later report section.

Based on our experience with similar projects, the results of the borings, and empirical correlations, we estimate that total settlements of individual footings should be less than 1 inch. Maximum differential settlements within the proposed structure are not expected to be greater than approximately $\frac{1}{2}$ inch over a horizontal distance of 30 feet.

In order to reduce the possibility of excessive settlement due to local shear or "punching" action, we recommend that column footings have a minimum lateral dimension of 2.5 feet and continuous wall footings have a minimum width of 2.0 feet. In addition, footings should be placed at sufficient depths to provide adequate protection against frost heave. It is recommended that exterior footings or footings in unheated areas should be placed at minimum depths of 30 inches below finished exterior grades for frost protection. Interior footings in heated areas can be located at minimum depths of 18 inches below finished floor grades, provided that architectural and structural considerations are also satisfied. However, if interior footings in future heated areas are constructed at levels less than 30 inches below surface grades and subsequently are subjected to freezing temperatures, there is a possibility for frost heave of those footings. Therefore, the Contractor should take adequate precautions to maintain temperatures above freezing around any shallow interior footings prior to enclosure and heating of the buildings.

All load-bearing wall foundations should be suitably reinforced with continuous longitudinal steel. To provide continuity and to minimize the effects of differential movements, the foundations should be constructed as continuous units to the greatest extent possible. Where top and bottom steel is provided in continuous wall foundations, a minimum footing thickness of 12 inches should be provided.

Ground-Supported Floor Slabs

Building floor slabs may be ground-supported on natural soils or new engineered fill soils, provided that the subgrades are prepared in accordance with the recommendations in the sections entitled <u>Subgrade Preparation</u> and <u>Fill Placement</u>. It is important that the slab subgrade be firm and stable before the placement of the granular subbase materials, the moisture barrier, and the concrete. Based on the test boring results, the anticipated slab subgrade should generally consist of approved existing fill, firm natural soils or new fill placed on approved existing fill or firm natural soils. For estimating design purposes, a modulus of subgrade reaction (k) of 120 pounds per cubic inch (pci) should be anticipated for the structural

design of slabs, provided that a minimum of 4 inches of aggregate subbase materials are provided and the subgrade has been prepared in accordance with the recommendations of this report.

The slab subgrades should be thoroughly proofrolled with suitable equipment and/or probed and observed by a qualified representative of the Geotechnical Engineer in an effort to detect unstable or otherwise unacceptable soil conditions. Proofrolling should be concentrated in those areas where any wall and utility backfill have been placed. Soils in any excessively unstable areas should be undercut and replaced with new engineered fill, as determined by the Geotechnical Engineer. Recommendations for construction of engineered fill are presented in a later report section.

It is recommended that ground-supported slabs be underlain by a minimum of 4 inches of CR-6 or GA S/B dense-graded aggregate or approved equivalents. Acceptable granular subbase materials should have no aggregate size greater than 1.5 inches, 95 to 100 percent passing the 1 inch sieve, and less than 12 percent passing the Number 200 sieve. The granular subbase materials will provide a capillary break between the subgrade and the concrete slab, a higher modulus of subgrade reaction, and more uniform support conditions. All granular aggregate materials should be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor compaction test method (ASTM D 1557).

In the event there is a significant time lag between the site grading work and the fine grading of concrete slab areas prior to the placement of the subbase stone or concrete, the Geotechnical Engineer should verify the condition of the prepared subgrade. Prior to final slab construction, the subgrade may require scarification and re-compaction to provide firm and stable conditions.

Where moisture vapor seepage through concrete slabs is a concern, a moisture vapor barrier, consisting of at least 8-mil polyethylene sheets, should be placed on top of the granular materials before the placement of the concrete. However, with the use of a moisture vapor barrier, special attention should be given to the surface curing of the slab in order to minimize uneven drying of the slab and any associated cracking and curling.

It is recommended that ground-supported slabs be isolated from the foundation footings so that differential movement between the footings and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration prevents the use of a free floating slab, the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab. Slabs must also be provided with proper control joints to minimize the effects of concrete shrinkage and possible differential movements. To minimize the widths of any shrinkage cracks that may develop near the surface of the slab, it is recommended that welded-wire mesh reinforcement be provided. The welded-wire mesh should be located in the top half of the slab to be effective.

Seismic Design

Section 1613.3.2 of the IBC 2012 refers to Chapter 20 of ASCE7 for seismic site classification, which is based on various criteria, one of which is the Standard Penetration Resistance, N_{bar} , derived from the Standard Penetration Test Procedure (ASTM D-1586). ASCE7 Table 20.3.1 provides correlations for Site Classes C, D, and E with various ranges of N_{bar} to be calculated

for the top 100 feet of the subsurface materials at a site in accordance with procedures described in Section 20.4.2 of ASCE7. In addition, the table presents criteria related to various soil properties for Site Classes E and F. ECS has used Table 20.3.1 of ASCE7 and the procedures outlined in Section 20.4.2 of ASCE7 to evaluate the Site Class for this project site.

Based on our review of the soil test boring results, it appears that the average N_{bar} value should be in the range of 15 to 50 blows per foot over a depth of 100 ft. This N_{bar} places the project site within the Site Classification of D, according to Table 20.3.1 of ASCE7.

Below-Grade Walls and Site Retaining Walls

Based upon our understanding of the proposed construction, below-grade wall and site retaining walls are not currently planned; however, the following recommendations are provided to guide the general design of below-grade building walls and site retaining walls for lateral earth pressures, should such designs become necessary.

It is very important with regard to construction of site retaining walls that soils within the critical zones behind the walls meet certain criteria with regard to soil type. For site retaining walls, the critical zone can be considered as the zone between the bottom back edge of the wall footing and an imaginary line extending upward and rearward from the bottom back edge of the wall footing at a 45-degree angle.

It is recommended that all natural soils and backfill soils within the critical zones of the walls should have USCS classifications of Sandy SILT (ML) or more granular. Any soils having classifications less granular than Sandy SILT (ML) may need to be removed from the critical zones of the walls, as determined by the Geotechnical Engineer at the time of construction.

Backfill materials for below-grade walls should be placed and compacted in accordance with criteria outlined in the **Earthwork** section of this report. The minimum degree of compaction for backfill soils behind below-grade building walls and conventional retaining walls should be 95 percent of the Standard Proctor maximum dry density (ASTM D 698), unless otherwise approved by the Geotechnical Engineer.

It is important that below-grade building walls that generally are designed for minimal displacements at the top of the wall should not be backfilled until the walls are adequately braced by permanent structural framing. Conversely, walls that are designed for active earth pressures generally should not be braced during backfill compaction, so that the walls can yield and rotate and develop active earth pressures. For yielding walls, it generally will be best not to place steel framing, or conventional masonry or concrete walls for the buildings, until wall backfilling operations have been completed.

Below-grade building walls and other retaining walls that are rigid and not free to rotate at the top should be designed for at-rest earth pressure conditions. Walls that are flexible and free to rotate at the top can be designed for active earth pressure conditions.

Based on the soil boring results, and consideration of typical properties for the encountered onsite Sandy SILT (ML) soil types and the SPT N-values the following parameters are recommended for design/evaluation:

Total (wet) unit weight: 115 pcfInternal friction angle: 28 degrees

 $\begin{array}{lll} \bullet & \text{At-rest earth pressure coefficient, } K_o: & 0.53 \\ \bullet & \text{Active earth pressure coefficient, } K_a: & 0.36 \\ \bullet & \text{Passive earth pressure coefficient, } K_p: & 2.76 \\ \bullet & \text{At-rest equivalent fluid pressure:} & 61H (psf) \\ \bullet & \text{Active equivalent fluid pressure:} & 42H (psf) \\ \bullet & \text{Sliding Resistance:} & 0.30 \\ \end{array}$

The value of H in the expressions above is defined as the height of the wall in units of feet against which the retained earth is placed. It should be noted that because the frictional and passive earth pressure resistances are based on limit strength conditions, appropriate factors of safety of at least 1.5 should be applied to the designs considering these resistances.

The design criteria presented above for evaluation of horizontal earth pressures on retaining walls are based on the assumption of level backfill conditions and the absence of free water within the wall backfill materials. Lateral pressures induced by sloping backfills and/or by any surcharge loadings adjacent to walls will also need to be considered in the wall designs. In addition, suitable drainage will need to be provided to intercept and to dispose of any surface infiltration and groundwater behind walls.

Additional resistance to sliding from passive earth pressure resistance also can be considered, if the earth materials considered for passive resistance will remain in place on the low side of the retaining wall. Equivalent fluid pressures for passive earth pressure resistance can be computed as 250D, in units of pounds per square foot, where D is the depth of undisturbed natural soil or engineered fill that will remain in place above the base of the wall footing.

The Geotechnical Engineer can provide additional design guidance regarding these and other aspects of below-grade wall and retaining wall design upon request.

Stormwater Management

Based on the provided information, management of stormwater will be necessary for the project. We understand that five (5) areas to the south and east of the new school building are being considered for stormwater management (SWM) facilities. Specific details regarding the planned SWM facilities were not provided at the time this report was prepared; however, we understand that the majority of facility bottoms will be less than 10 ft below existing grades and that infiltration is desirable for the planned SWM facilities.

The subsurface conditions within the planned SWM facilities were evaluated with Borings SWM-1 through SWM-5. The details about the soil strata for each boring can be seen on the soil boring logs in the Appendix.

Field infiltration testing was performed in Borings SWM-1 through SWM-5 at a depth of 10 ft below existing grades. In addition, laboratory testing consisting of soil gradation by hydrometer (USDA classification) was performed on representative soil samples recovered from Borings SWM-1 through SWM-5. Infiltration feasibility for the planned SWM facilities was evaluated based on field infiltration testing in the SWM borings and on the USDA classification for the encountered soils in the SWM facilities. Typically infiltration is considered feasible when the infiltration rate for soils at SWM facility inverts exceeds 1.02 in/hr, which corresponds to a USDA classification of Sandy Loam or more granular, provided that seasonal high groundwater or the presence of an impervious layer/bedrock is at least 4 ft below the facility invert.

As noted in the **Water Level Observations** section of this report, groundwater was not encountered during drilling operations in Borings SWM-1 through SWM-5. In addition, rock was not encountered to the depths explored in the SWM borings.

A summary of the encountered soil conditions at the SWM inverts and field infiltration test results are summarized in the table below:

Boring	Field Infiltration Test EL	Groundwater Encountered	Soil near Facility Invert (USDA)	Field Infiltration Rate (in/hr)	Infiltration Feasibility
SWM-1	71	No	Loam	0.0	No
SWM-2	62	No	Sandy Loam	0.0	No
SWM-3	70	No	Silty Clay Loam	0.0	No
SWM-4	70	No	Clay Loam	0.0	No
SWM-5	70	No	Sandy Clay Loam	0.0	No

The laboratory results indicate that the soils at the infiltration test depths generally consist of Sandy Loam, Loam, Silty Clay Loam, Sandy Clay Loam and Clay Loam, per the USDA classification. Soils classified as Sandy Loam, such as those encountered at the infiltration test depth in SWM-2, meet the infiltration requirements of 1.02 in/hr; however, field infiltration testing indicated a low infiltration rate, likely due to the in-situ density of these soils. The boring results in SWM-2 indicated medium dense granular soils underlain by very stiff cohesive soils. Therefore, it is ECS' opinion that infiltration is not feasible in SWM-2 at the infiltration test elevation.

Soils classified as Loam, Silty Clay Loam, Sandy Clay Loam and Clay Loam, such as those encountered at the infiltration test depths in SWM-1, SWM-3, SWM-4 and SWM-5, do not meet the infiltration requirements of 1.02 in/hr. Additionally, the field infiltration testing in SWM-1, SWM-3, SWM-4 and SWM-5 indicated a low infiltration rate, likely due to the soil types and insitu density of these soils. Therefore, it is ECS' opinion that infiltration is not feasible in SWM-1, SWM-3, SWM-4 and SWM-5 at the infiltration test elevations.

Pavement Construction

Details regarding traffic conditions anticipated for the site were not provided. However, based on previous experience, it is ECS' opinion that two pavement sections generally should be considered for use – a light-duty pavement section for areas that will be subjected primarily to

automobile and light-truck traffic and a heavy-duty pavement section for areas that will be subjected to some routine heavier truck traffic, in addition to normal automobile and light-truck traffic. It is our judgment that traffic conditions associated with standard-duty pavements can be represented by approximately 25,000 18-kip equivalent single-axle loads (ESALs) during an approximately 20-year service life, while traffic conditions associated with medium-duty pavements can be represented by approximately 250,000 ESALs during an approximately 20-year service life.

It is ECS' opinion that use of the light-duty pavement section and the heavy-duty pavement section most likely will be sufficient for traffic conditions likely to occur at the development. However, traffic loading conditions are an extremely important parameter with regard to pavement design. Therefore, if the traffic condition estimates provided above are considered to be inappropriate for the project, please advise ECS so that revised pavement section designs can be determined for the final geotechnical report for this site. Final decisions regarding pavement sections can be made as project design progresses, when further input regarding likely traffic conditions can be provided by other Design Team members.

Subgrade support conditions are the other major parameter of importance to pavement design and performance. Based on the boring results, it is anticipated that the subgrade soil conditions exposed at final subgrade levels when the project site is graded prior to pavement construction will consist of new engineered fill constructed over approved existing fill or natural soils, which consist of Clayey SAND (SC), CLAY (CL) or Silty CLAY (CL). SC/CL material generally exhibits low CBR values; therefore, we recommend considering the utilization of soil cement treatment of the upper 12 inches of the SC/CL material. Based on our experience with similar soil types, a 5% soil-cement ratio should be considered.

Based upon our previous experience with similar site conditions, it is our judgment that the typical pavement subgrade soils such as the soils encountered at the site treated with 5% cement should exhibit a minimum California Bearing Ratio (CBR) value of 5 when compacted to at least 95 percent of the maximum dry density, as determined by the Standard Proctor test (ASTM D 698). Therefore, for pavement design a CBR value of 5 is considered.

The pavement sections provided in this report (for budgeting purposes) have been designed based on methodology from the American Association of State Highway and Transportation Officials' (AASHTO) *Guide for Design of Pavement Structures*, 1993. Summarized below are the subgrade strength parameters, the traffic conditions, and other design parameters and criteria considered in these analyses.

CBR value: 5
Traffic for Light-Duty Pavement: 25,000 ESALs
Traffic for Medium-Duty Pavement: 250,000 ESALs
Reliability: 85 percent
Overall Variance: 0.45
Initial Serviceability: 4.2
Terminal Serviceability: 2.0

Using the above-indicated design parameters, we have estimated pavement section designs as shown in the following table.

Pavement Material	Compacted Material Thicknesses (Inches)*				
	Light-Duty (25,000 ESALs)	Medium-Duty (250,000 ESALs)			
Surface Course Asphalt					
HMA SuperPave - 9.5 mm **	1.5	2.0			
Base Course Asphalt					
HMA SuperPave – 19 mm **	2.5	3.0			
Graded Aggregate Base					
GAB	4.0	6.0			
Total Pavement Thickness	8.0	11.0			
* Compaction: Level 1 (50 Gyrations)					
** Binder Type: PG64-22					

Final determinations of pavement sections to be used at the site may not be possible until the time of actual construction, depending on the sequence of grading and availability of materials, when the subgrade soil conditions become exposed in the various site areas. For planning and pricing considerations, however, it is anticipated that the pavement sections shown for a CBR value of 5 with a soil-cemented subgrade should provide a reasonable estimate of the average pavement sections that will be needed for the site.

The standard-duty pavement section shown in the table above should only be considered for use in areas where traffic will consist primarily of automobiles and light trucks and where any regular use by heavier trucks will be prohibited, such as proposed parking lot areas. The medium-duty pavement section shown in the table above should be considered for the main site entrances and main service drives that may experience some use by heavier vehicles.

It is ECS' opinion that the suggested medium-density flexible pavement section would not be suitable for the support of heavy, concentrated wheel loads. Therefore, we recommend that rigid Portland cement concrete pavement sections should be provided for any dumpster storage areas and for any unloading zones for deliveries. The Portland cement concrete pavement section should be at least 6 inches thick and should consist of air-entrained Portland cement concrete having a minimum 28-day compressive strength of 4,000 pounds per square inch (psi). A minimum of 6 inches of compacted dense-graded aggregate subbase (CR-6 or GASB) should be placed beneath all rigid concrete pavements. For any dumpster storage areas, the Portland cement concrete slab area should be large enough to support the dumpster and at least the front wheels of the truck used to unload the dumpster.

The State of Maryland is now using pavement materials whose characteristics are based on the new SuperPave material specifications, rather than on the older Marshall mix-design specifications. We have provided specifications for Superpave materials in the tables above. Please note that it is important to specify the Compaction Level and the Binder Type for SuperPave materials.

All pavement materials and construction should be in accordance with the most current version of the *Standard Specifications for Construction and Materials* of the Maryland Department of Transportation, State Highway Administration (SHA), and any applicable Baltimore County standards.

The pavement sections provided in the tables above were developed for the anticipated residential in-service traffic conditions only and do not provide an allowance for construction traffic conditions. Therefore, if pavements will be constructed early during site development to accommodate construction traffic, consideration must be given to the construction of heavier pavement sections, capable of accommodating the much heavier loads normally associated with construction traffic, as well as the future in-service traffic. ECS can provide additional design assistance with regard to pavements during the final geotechnical study.

Earthwork Operations

Subgrade Preparation

Subgrade preparation should generally include the stripping of any unsuitable surface materials from the areas to be developed. Caution should be taken when stripping unsuitable materials so as not to mix these materials with otherwise suitable subgrade soils. It is recommended that the stripping of topsoil or other deleterious materials be extended to a minimum of 5 feet beyond the building and pavement limits. A qualified representative of the Geotechnical Engineer should observe the removal operations to determine the necessary horizontal and vertical limits of excavation. The actual depths, quantities, and quality of surface materials must be determined during the stripping operations.

Prior to the placement of any new fill materials or subbase materials for foundations, slabs, or pavements, a qualified representative of the Geotechnical Engineer should observe the exposed subgrade soils. At that time, the exposed soils should be thoroughly proofrolled by a vehicle having an axle load of at least 10 tons, such as a loaded, tandem-axle dump truck. This proofrolling procedure is intended to assist in identifying any unstable materials that may need to be improved in place or removed. If areas exist that are not accessible for proofrolling operations, the Geotechnical Engineer should evaluate the soils at the exposed subgrade levels by conducting hand auger borings and Dynamic Cone Penetrometer (DCP) tests.

Fill Placement

Prior to placement of compacted fill, representative bulk samples (about 50 pounds) should be taken of the proposed fill soils and laboratory tests should be conducted to determine Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships for compaction. These test results will be necessary for proper control of construction for new engineered fill.

Upon achieving competent subgrade conditions, the Contractor can place and compact engineered fill to reach final subgrade levels. In general, any materials to be used as structural fill should consist of soil types classified as ML or more granular, in accordance with ASTM D

2487, and should have a Liquid Limit less than 40 and a Plasticity Index less than 20. However, materials used as backfill behind below-grade walls or retaining walls should have classifications of SM, or more granular, in accordance with ASTM D 2487, and should have no more than 30 percent by weight of soil particles finer than the No. 200 sieve. Based on the boring results, the majority of the onsite material may not be usable as structural fill.

Finer-grained, more plastic, and organic soil types types (MH, CH, OL, OH, Pt),, if encountered at the site, may be used as fill materials in landscape areas. Any such materials encountered during grading operations should be either stockpiled for later use in landscape fills, or should be placed in approved disposal areas either on-site or off-site.

Prior to the utilization of any on-site or off-site borrow materials, the Geotechnical Engineer should be provided with representative samples in order to determine the suitability of the materials for use as a controlled compacted fill and to develop moisture-density relationships. In order to expedite the earthwork operations, it is recommended that any off-site borrow materials generally should be comprised of SM or more granular soil types.

All structural fill should be placed in loose lifts, which do not exceed 8 inches in thickness, and should be compacted to at least 95 percent of the maximum dry density, as determined by the Standard Proctor Compaction Test (ASTM D 698). Generally, the moisture content of the fill material should be maintained within ±2 percentage points of the optimum moisture content for the fill material, as determined by ASTM D 698. Fill materials in the upper 1 foot of slab subgrades should be compacted to at least 98 percent of the Standard Proctor maximum dry density. Fill placed in non-structural areas should be compacted to at least 90 percent of the Standard Proctor maximum dry density in order to avoid significant subsidence.

Due to the textural variations of the on-site soils, variations in moisture-density relationships should be anticipated. Such variations must be determined in the field by a qualified representative of the Geotechnical Engineer at the time of construction, so that any necessary changes to fill placement and compaction procedures can be implemented.

The footprint of the proposed building area should be well defined, including the limits of the fill zones at the time of fill placement. Grade controls should be maintained throughout the filling operations. All filling operations should be observed on a full-time basis by a qualified representative of the Geotechnical Engineer to determine that minimum compaction requirements are being achieved. A minimum of one compaction test per lift should be made per 2,500 square feet of fill lift area, but not fewer than two tests per lift should be made for any lift. The elevations and locations of the field density tests should be clearly identified at the time of fill placement and compaction.

Compaction equipment suitable for the soil types being used as fill should be selected to compact the fill. Theoretically, any equipment type can be used, so long as the required density is achieved. Ideally, a steel drum roller generally will be the most efficient for compaction of granular soil types and for sealing the surface soils, while a sheepsfoot roller or pneumatic-tire roller generally will be most efficient for compaction of cohesive soil types. At the end of each work day, all fill areas should be graded to facilitate surface drainage of any surface runoff associated with precipitation, and should be sealed by use of a smooth-drum roller to limit infiltration of surface water.

During placement and compaction of new fill at the beginning of each workday, the Contractor should scarify existing subgrade soils so that a weak plane will not be formed between the new fill and the existing subgrade soils. We recommend that subgrade soils should be scarified to depths of about 4 inches prior to placement of new fill.

Fill materials should not be placed on frozen soils, frost-heaved soils, and/or excessively wet soils. All frozen, frost-heaved, or excessively wet soils should be removed prior to continuation of fill operations. Borrow fill materials should not contain frozen materials at the time of placement. All frozen, frost-heaved, or excavated wet soils should be removed prior to placement of controlled, compacted fill. Moisture contents for excessively wet soils will need to be lowered to the range limits previously discussed.

If any problems are encountered during the earthwork operations, or if site conditions deviate from those indicated by the borings, the Geotechnical Engineer should be notified immediately.

Construction Considerations

The on-site soils contain silt and clay fines that will be sensitive to moisture increases and to construction disturbance. Construction activities in the presence of excessive moisture can lead to softening of the subgrade soils and loss of bearing capacity. Therefore, it will be prudent to schedule earthwork operations during the warmer and drier seasons that generally occur from late spring to early fall. Measures should also be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to provide for drainage of surface water from areas being developed.

A firm working surface for the placement of engineered fill should be established prior to construction of new fills. The moisture content of the fill soils at the time of placement should be carefully controlled to ensure that the required compaction effort can be achieved without excessive pumping or movement of the fill mass. In the event that the earthwork operations are accomplished during the cooler and wetter periods of the year, delays and additional costs should be anticipated. At these times, reduction of soil moisture may need to be accomplished by a combination of mechanical manipulation and the use of chemical additives, such as lime or cement, in order to lower moisture contents to levels appropriate for compaction.

As noted in the **Water Level Observations** section of this report, groundwater was encountered during drilling in Boring B-12 at a depth of 22 ft below existing grade and is not anticipated to impact footing excavations. Any groundwater encountered during the construction of the building would likely be the result of perched water trapped within the subgrade materials and should be readily managed by interceptor trenches and localized systems of sumps and pumps.

Because the on-site soils are moisture-sensitive and are susceptible to loss of strength upon exposure to precipitation during construction activity, all foundation excavations must be protected to prevent the disturbance of the subgrade materials and to minimize any potential loss of support capacity. Foundation concrete generally should be placed for foundations during the same day that the foundation excavations are made and approved. Should excavating and placing the foundation concrete the same day not be practical, we recommend that a concrete mud mat, 2 to 3 inches thick, be placed to protect the subgrade soils from

moisture changes and disturbance. If protection of the soils is not provided, then undercutting of softened or loosened soils may be necessary prior to the placement of reinforcing steel and foundation concrete.

Prior to the placement of any foundation concrete or mud mat, the subgrade soils must be carefully examined and tested by a qualified representative of the Geotechnical Engineer to confirm the availability of the design soil bearing capacity. To minimize disturbance to the subgrade soils during excavation, we recommend that a bucket without scarifying teeth, in addition to hand excavation methods, be used during the final phases of the excavation for the foundations.

Any cuts or excavations associated with building and utility excavations may require forming or bracing, slope flattening or other physical measures to control sloughing and/or to prevent slope failures. An examination of the applicable codes (e.g. OSHA) should be made by the appropriate Contractor to ensure that adequate protection of the excavations and trench walls is provided.

The surface soils contain fines and are considered erodible. The Contractor should provide and maintain good site drainage during earthwork operations to help to maintain the integrity of the surface soils. All erosion and sedimentation shall be controlled in accordance with sound engineering practice and current local requirements. Surface water should be directed away from the construction area, and the work area should be sloped at gradients of 1 to 2 percent to reduce the potential for ponding water and the subsequent saturation of the surface soils.

CLOSING

This report has been prepared to provide Grimm and Parker Architects and the Design Team with subsurface information and evaluations and recommendations to guide geotechnical-related design and construction for development of the site. The report scope is limited to this specific project and the location described. The project description represents our current understanding of the significant aspects of the proposed development relevant to geotechnical considerations for the project.

The evaluations and recommendations presented in this report are, of necessity, based on the information made available to us at the time of the actual writing of the report and the site conditions, surface and subsurface, that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the aerial extent of the site and to depth, are representative of general subsurface conditions across the site. If subsurface conditions are encountered that differ significantly from those reported herein, the Geotechnical Engineer should be notified immediately so that the analyses and recommendations presented in this report can be reviewed for validity.

Should there be significant changes to the proposed construction; ECS may need to review the changes to determine whether the evaluations and recommendations of this report will remain valid. ECS should be provided with appropriate plans and other information as project design progresses, so that we can review the information and provide additional geotechnical exploration, testing analyses, and guidance, as needed. In addition, the Geotechnical Engineer should be retained to prepare, or at least to review, the earthwork specifications, to assure that the recommendations of the final report have been properly interpreted and included in the construction documents.

APPENDIX

- Site Location Diagram
- Unified Soil Classification System
- Laboratory Test Results
- Reference Notes For Boring Logs
- Boring Logs
- Boring Location Plan
- Generalized Subsurface Soil Profiles
- Below Grade Wall Drainage





Site Location Diagram HOLABIRD PK-8 SCHOOL

GRIMM AND PARKER BALTIMORE MD 21224

ENGINEER	
SCALE	
	1 " = 500 '
PROJECT NO	
	02:8153
SHEET	
	1 OF 1
DATE	
	7/29/2016

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

N	Major Divis	ions	Grou		Typical Names				I al	ooratory C	lassifica	tion Cri	teria		
			Symb		Well-graded gravels, gravel- sand mixtures, little or no fines	soils			C _u = D	D ₆₀ /D ₁₀ gread D ₃₀) ² /(D ₁₀ x	ater thar	n 4			
	se fraction is eve size)	Clean gravels (Little or no fines)	GP)	Poorly graded gravels, gravel-sand mixtures, little or no fines	se-grained)		Not m	eeting all (gradation	n requir	ements for GV	1	
rained soils larger than No. 200 Sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Gravels with fines (Appreciable amount of fines)	GMª	d u	Silty gravels, gravel-sand mixtures	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils		gols ^b		erg limits less than		A" line	Above "A" I between 4 borderline ca use of dual s	and 7 ses requ	are
Coarse-grained soils laterial is larger than	N)	Gra (Appre	GC	;	Clayey gravels, gravel-sand- clay mixtures	rain-size c r than No.		g dual sym		erg limits less than		\" line			
Coarse-grant		Clean sands (Little or no fines)	SW	′	Well-graded sands, gravelly sands, little or no fines	ivel from g	S SP	es requirin	$C_u = C_c = C_c$	0 ₆₀ /D ₁₀ gread D ₃₀) ² /(D ₁₀ x	ater thar D ₆₀) betv	n 6 ween 1	and 3		
Coarse-gr (More than half of material is	se fraction sieve size)	Clean (Little fin	SP	•	Poorly graded sands, gravelly sands, little or no fines	nd and gra fines (fract	GW, GP, SW, SP GM, GC, SM, SC	erline case	Not m	eeting all (gradatior	n requir	ements for SW	,	
(More tha	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Sands with fines (Appreciable amount of fines)	SMª	d u	Silty sands, sand-silt mixtures	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200	are classified as follows: Less than 5 percent GW, More than 12 percent GM,			erg limits a less than		\" line	Limits plotting zone with Page 2000 and 7 are	I. between	en 4 erline
	(Mc	San (Apprec	SC	•	Clayey sands, sand-clay mixtures	Determine Dependin	are classii Less than More thar	5 to 12 pe		erg limits a		\" line	cases requi dual symbols		e OI
	ays	than 50)	ML	-	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity					Plast	ticity Ch	nart			
200 Sieve)		iid limit less 1	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		60 50						"A" line		
; nan No.	;	(Ligh	OL	=	Organic silts and organic silty clays of low plasticity		× 40						СН		
Fine-grained soils (More than half material is smaller than No. 200	S/S	than 50)	МН	I	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		Plasticity Index 30 20			CL					
Fine-gr f material is	Silts and clays	ımıt greater	СН	I	Inorganic clays of high plasticity, fat clays] ā	10 10					MH	I and OH		
e than hall	io :	(Liquid	ОН	l 	Organic clays of medium to high plasticity, organic silts		0		CL-MI	ML aı	nd OL		70 00	00 100	
(Mor	Highly	Organic soils	Pt		Peat and other highly organic soils	0 10 20 3			30 4	40 50 Liquid		70 80	90 100	U	

^a Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

^b Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC,well-graded gravel-sand mixture with clay binder. (From Table 2.16 - Winterkorn and Fang, 1975)

Laboratory Testing Summary

Page 1 of 2

					Atter	Atterberg Limits ³ Pe		Percent	Moisture - De	nsity (Corr.)5	_	
Sample Source	Sample Number	Depth (feet)	MC ¹ (%)	Soil Type ²	LL	PL	PI	Passing No. 200 Sieve ⁴	Maximum Density (pcf)	Optimum Moisture (%)	CBR Value ⁶	Other
B-1												
	S-1	1.00 - 2.50	11.8									
	S-2	3.50 - 5.00	17.7									
	S-3	6.00 - 7.50	21.1									
	S-4	8.50 - 10.00	19.2									
	S-5	13.50 - 15.00	16.5									
	S-6	18.50 - 20.00	15.7									
	S-7	23.50 - 25.00	19.2									
B-4												
	S-1	1.00 - 2.50	19.6									
	S-2	3.50 - 5.00	21.6									
	S-3	6.00 - 7.50	13.6									
	S-4	8.50 - 10.00	15.7									
	S-5	13.50 - 15.00	20.8									
	S-6	18.50 - 20.00	16.2									
	S-7	23.50 - 25.00	18.3									
B-5												
	S-1	1.00 - 2.50	11.2	CL	40	18	22	91.9	112.2	16.5		
B-11												
	S-1	1.00 - 2.50	16.9									
	S-2	3.50 - 5.00	17.5									
	S-3	6.00 - 7.50	15.5									
	S-4	8.50 - 10.00	12.9									
	S-5	13.50 - 15.00	14.3									
	S-6	18.50 - 20.00	18.1									
	S-7	23.50 - 25.00	18.3									
SWM-1												
·	S-4	8.50 - 10.00	20.7	·								

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 8153

Project Name: Holabird PK-8 School
PM: Dawn M. Appelbaum
PE: Hasan M. Aboumatar
Printed On: Friday, July 29, 2016



					Atterl			Percent	Moisture - De	nsity (Corr.)5		Page 2
Sample Source	Sample Number	Depth (feet)	MC1 (%)	Soil Type ²	LL	PL	PI	Passing No. 200 Sieve ⁴	Maximum Density (pcf)	Optimum Moisture (%)	CBR Value ⁶	Other
SWM-2												
	S-4	8.50 - 10.00	12.8									
SWM-3												
	S-4	8.50 - 10.00	16.1									
SWM-4												
	S-4	8.50 - 10.00	19.8									
SWM-5												
	S-4	8.50 - 10.00	14.4									

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

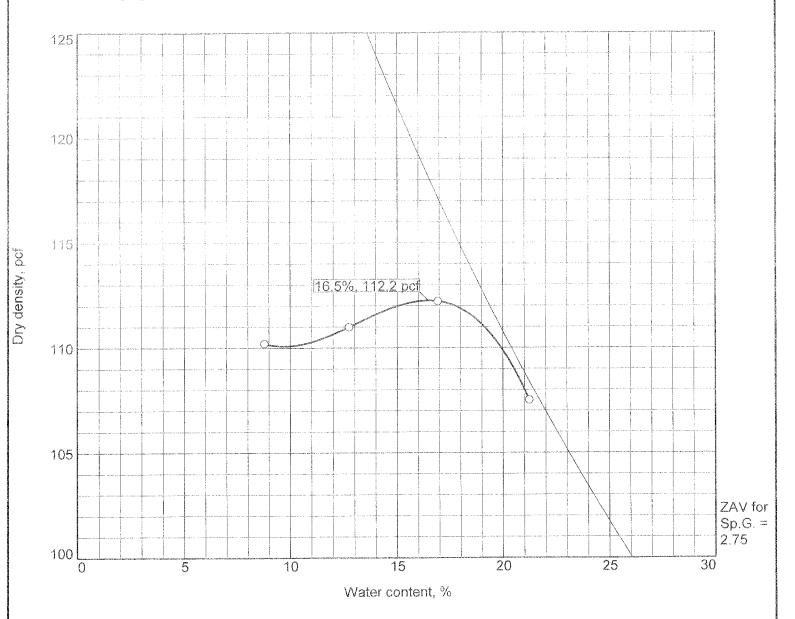
Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 8153

Project Name: Holabird PK-8 School
PM: Dawn M. Appelbaum
PE: Hasan M. Aboumatar
Printed On: Friday, July 29, 2016



COMPACTION TEST REPORT For Curve No. 1



Test specification: AASHTO T 99-01 Method C Standard

Elev/ Depth	Classification USCS AASHTO		Nat. Moist.	Sp.G.	There is a state of the state o	Pi	% > 3/4 in.	% < No.200
1.00-2.50	CL		11.2	2.75	40	22	0	91.9

TEST RESULTS MATERIAL DESCRIPTION Maximum dry density = 112.2 pcf Optimum moisture = 16.5 % Project No. 8153 Client: Grimm and Parker Architect Remarks:

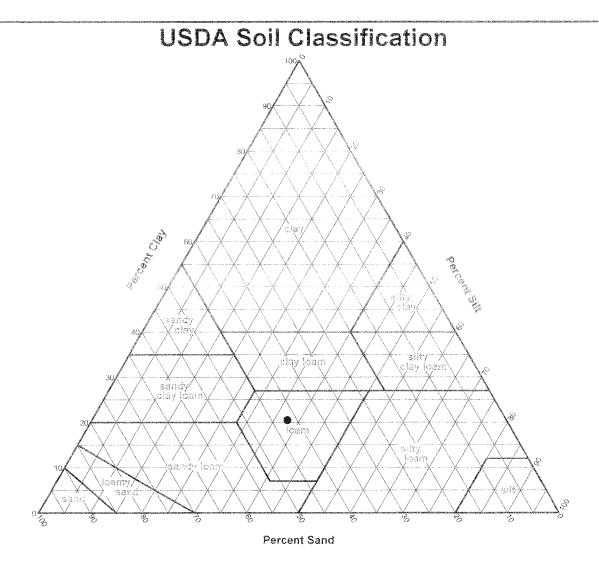
Project: Holabird PK-8 School

Date:

O Source of Sample: B-5 Sample Number: S-1



Phone: (410) 859-4300 Fax: (410) 859-4324

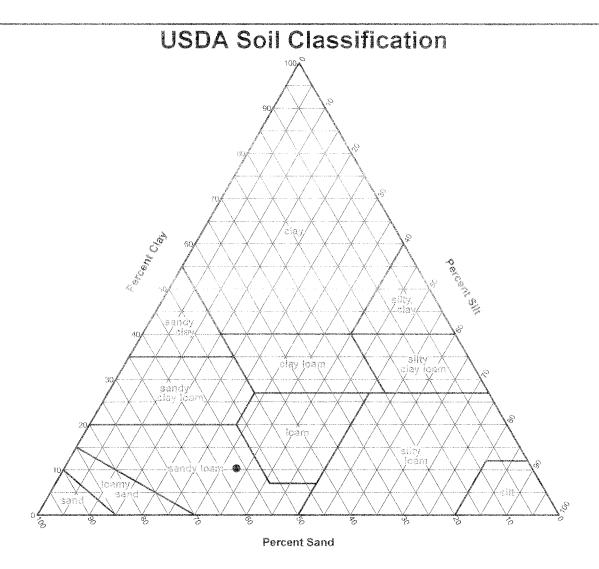


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	Source	No.		Sand	Silt	Clay	Classification				
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ECS MID-ATLANTIG, LLC
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Nanover, MD 21076
Phone: (410) 859-4369

Client: Grimm and Parker Architect
Project: Holabird PK-8 School

Project No.: 8153



LINES INCIDIA WAY ALSO	armer var verste ver verste verste fill de Stads van de Austria verste kommende Freide van de ken van Arme	inanta kali katalan kani kanan mentendakan kali kanan kanan kenantakan kila 1950 da	- CARRICAN STATE OF THE STATE OF	SOIL DA	λTA	Gerick Derei (until 1960 van verste de de de Militaria), de hen en de de hen de de hen de de de de de de de de	анствой bel тот ден от тот потом прости в невый (1666) в 1666 б. б. бый надажей ден ден от чет и повед от а тот в навивающит от от от тот ут от ден
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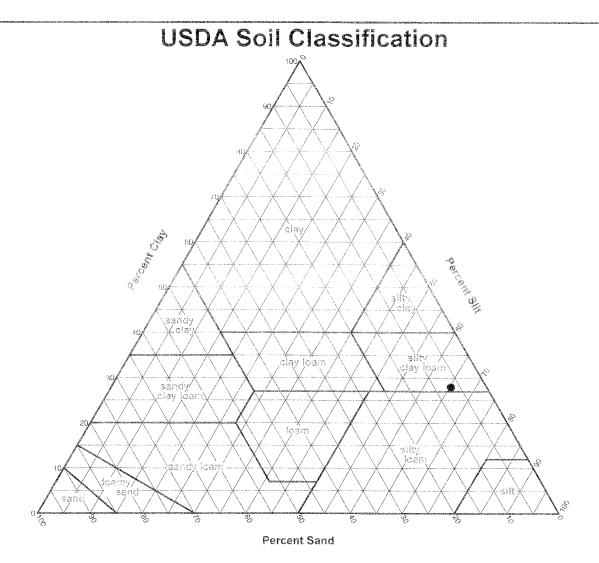
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1340 Charwood Road, Suite A Hanover, MD 21076 Phone: (410) 859-4360 Client: Grimm and Parker Architect

Project: Holabird PK-8 School

Project No.: 8153



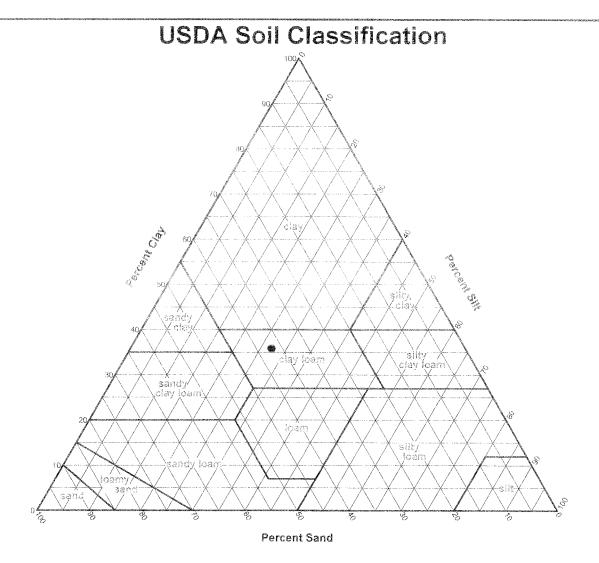
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	Source	Sample		Percentages F	rom Material Passir						
	Source	No.	se in participation of the relative measurement of the relative measurement and the relative measurement of the re	Sand	Silt	Clay	Classification				
	SWM-3	S-4	8.50-10.00	6.8	65.3	27.9	Silty clay loam				
				om tida, James po projektora medinako pera seki, kajar 1940. 1940. 1940. 1940.	THE THEORY OF THE PARTY OF THE						
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		000 miles versional voor 27 miles in Austra in Austra in 18 miles		ind determine which his makes it is the little determined by the little determine where the	PERSON PENSON PENSON PENSON DE LA LIGE PENSON DE LA LIGE DE LA LIGIT DELLA LIGIT DELLA LIGIT DE LA LIGIT DE LA LIGIT DELLA LIGIT DE LA LIGIT DELLA LIGIT	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS					
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ECS MID-ATLANTIC, LLC

1340 Charwood Road, Soite A. Hanoyer, MD 21076 Phone. (410) 859-4300 **Client:** Grimm and Parker Architect **Project:** Holabird PK-8 School

Project No.: 8153



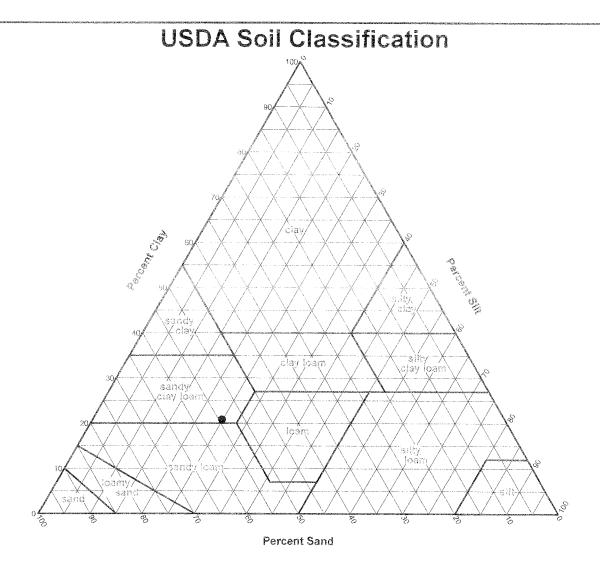
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	Source	Sample	Depth		rom Material Passi	Classification	
		No.		Sand	Silt	Clay	Classification
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ECS MID-ATLANTIC, LLC

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Project: Holabird PK-8 School

Project No.: 8153



Source SWM-5	Sample No. S-4	Depth 8.50-10.00	Sand	om Material Passing Silt		Classification
********************************	No.	8 50-10 00	Sand			Gassincation
SWM-5	S-4	8 50-10 00		CONTRACT DESCRIPTION OF THE PROPERTY OF THE PR	Clay	~ 122-2011-014-10-13
i			54.4	24.9	20.8	Sandy clay loam
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EGS

ECS MID-ATLANTIC, LLC 1340 Charwood Road, Suite A Hanover, MD 21076

1340 Charwood Road, Suite A. Hanover, MD 21076 Phone: (410) 859-4360 Client: Grimm and Parker Architect

Project: Holabird PK-8 School

Project No.: 8153

REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressuremeter
DC	Dutch Cone Penetrometer	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

II. Correlation of Penetration Resistances to Soil Properties

Standard Penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch OD split-spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Dens	ity	Relative	Properties
Under 4 blows/ft	Very Loose	Adjective Form	12% to 49%
5 to 10 blows/ft	Loose	With	5% to 12%
11 to 30 blows/ft	Medium Dense		
31 to 50 blows/ft	Dense		
Over 51 blows/ft	Very Dense		

		Davida Cina Islantification
	F	Particle Size Identification
Boulders		8 inches or larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	1/4 to 1/2 inch
Sand	Coarse	2.00 mm to 1/4 inch (dia. of lead pencil)
	Medium	0.42 to 2.00 mm (dia. of broom straw)
	Fine	0.074 to 0.42 mm (dia. of human hair)
Silt and Clay		0.0 to 0.074 mm (particles cannot be seen)

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	Consistency	Unconfined Comp. Strength Q _p (tsf)	Degree of Plasticity	Plasticity Index
Under 2	Very Soft	Under 0.25	None to slight	0 - 4
3 to 4	Soft	0.25-0.49	Slight	5 – 7
5 to 8	Medium Stiff	0.50-0.99	Medium	8 – 22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00-8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL Water Level	BCR	Before Casing Removal	DCI	Dry Cave-In
WS While Sampling	ACR	After Casing Removal	WCI	Wet Cave-In
WD While Drilling	∇	Est. Groundwater Level	▼ Est. Se	asonal High GWT

The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clay and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

CLIENT							JOB # BORING # SHEET			SHEET		
Grimm	an NAME	d Pai	ke	r Arc	chitect	4	8153 ARCHITECT-ENGINE	ER .	B-1		1 OF 1	ECC
Holabi							Grimm and P		rchite	ct		
					0'' (D 1/2 1.4	_				-O- CALIBRATED PI	ENETROMETER TONS/FT ²
NORTHING	<u>mıa</u>	Stre	et,	<u>Balti</u> Eastin	more, City of	STATION	<u>U</u>				ROCK QUALITY DESIGNATION & RECOVERY RQD% - — - REC% ——	
	Ö.	J.	ST. (IN)	(IN)	DESCRIPTION OF M. BOTTOM OF CASING		ENGLIS	H UNITS	VELS			WATER LIQUID LIMIT%
ОЕРТН (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATION		LOSS OF CIRCULAT	ION Z	WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STANDAR	RD PENETRATION OWS/FT
0 _					Topsoil Depth	4.00"]			85		: :	: : :
\exists	S-1	ss	18	18	Medium Dense		ddish Tan, Moist,			4 5 6	11-@-11.8	
	S-2	ss	18	18					_	4 9 6	15-⊗●-17.7	
5					(CL) LEAN CL	AY. Red. Moist.	Stiff to Very Stiff		- 80		: :	
=	S-3	SS	18	18	(,	, , , , , , , , , , , , , , , , , , , ,			-	5 6 7	13-🛇 🕒-21.	.1
10	S-4	ss	18	18					- - - 75	4 5 7	12-🛇 🗲-19.2	
									- - -			
	_								—	7		
15	S-5	SS	18	18					70	7 10	17-16.5	
_					(CL) LEAN CL	AY WITH SAND,	WITH SAND, Red, Moist,					
20	S-6	ss	18	16	7 5. , 2					6 7 10	15.7	
					(01) 15411 01	N/ B M	0.77					
	S-7	SS	18	18	(CL) LEAN CL	AY, Red, Moist, '	very Still		—	8 10	19.2-● ⊗-2	
25	3-1	33	10	10	END OF BORI	NG @ 25'			- 60	13	19.2 🛡 🛇 2	
									<u> </u>			
									-			
30									— — 55			
-1	ı	ı		1	I			· F		ı		
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∰ WL C	RY			ws□	WD ⊠	BORING STARTED 07/28/16 CAVE IN DEPTH @ 18.3'						
₩ WL(SH	IW)		<u>-</u>	WL(AC	R) DRY	BORING COMPLETED 07/28/16 HAMMER TYPE Auto						
<u>₩</u> WL						RIG Truck	FOREMAN	DALE PR	ICE	DRILI	ING METHOD CME 55	50

CLIENT						Jo	JOB# BORING# SHEET			SHEET	
Grimn PROJECT	n an	d Pa	rke	r Arc	chitect	A	8153 B-2 1 OF 1				
Holab SITE LOC	ird F	² K-8	Sc	<u>hool</u>			Grimm and Par	ker Archit	ect	O CALIDDATED D	ENSTROMETED TONO/ET²
1500	Imla	Stre	et	Ralti	more City of	Baltimore MΓ)			-O- CALIBRATED PI	ENETROMETER TONS/FT ²
NORTHIN	G	<u> </u>		EASTIN	IG	Baltimore, MD		REC% ———			
		ш	Î.	<u> </u>	DESCRIPTION OF M	ATERIAL	ENGLISH (LIMIT% COI	ATER LIQUID
E SOLUTION OF CASING LOSS OF CIRCULATION (MIX)										×	lack
DESCRIPTION OF MATERIAL SAMPLE TYPE SAMPLE TYPE SAMPLE TYPE SOURCE OF THE TYPE SOURCE TYPE											D PENETRATION OWS/FT
O _ Topsoil Depth [8.00"] (CL) LEAN CLAY, Red, Moist, Medium Stiff to											
S-1 SS 18 10 Very Stiff										8-⊗	
=	S-2	ss	18	16				80	5 9 12	21-8	
5 —					(CL/ML) QLTV	CLAY, Trace Sa	nd Pod Moiet	HANN	12		
	S-3	SS	18	18	Very Stiff	CLAT, Hace Sa	iria, Rea, Moist,		5 7 10	17-🛇	
	S-4	ss	18	18				75	6 8	16-⊗	
10									8		
_											
	S-5	SS	18	18				70	6 8 11	19−⊗	
15 —											
_					(CL) LEAN CL	AY, Red, Moist, V	ery Hard				
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_											
_									15		
25 —	S-7	SS	18	18				60	23 29		52-📎
25 —					END OF BORI	NG @ 25'					
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₹ WL	DRY			ws□	WD⊠	BORING STARTED	CAVE IN DEPTH @ 20.1'				
₩ WL(SI	HW)		<u>=</u>	WL(AC	R) DRY	BORING COMPLETE					
₩ WL RIG Truck FOREMAN DALE PRICE								ALE PRICE	DRIL	LING METHOD CME 55	60

CLIENT							JOB # BORING #			SHEET		
Grimn PROJECT	n an	d Pa	rke	r Arc	chitect		8153 B-3 1 OF 1 ARCHITECT-ENGINEER					
Holab SITE LOC	ird F	PK-8	Sc	<u>hool</u>			Grimm and Par	ker Archite	ect	-O- CALIBRATED B	ENETROMETER TONS/FT²	
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NORTHIN	G			EASTIN	lG !	STATION		ROCK QUALITY DE:	SIGNATION & RECOVERY REC% ———			
		ш	Ñ.	<u> </u>	DESCRIPTION OF M	ATERIAL	ENGLISH (LIMIT% CO	VATER LIQUID NTENT% LIMIT%	
H (FT)	М О	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	BOTTOM OF CASING	3	LOSS OF CIRCULATION	WATER LEVELS ELEVATION (FT)	BLOWS/6"	X	lack	
											RD PENETRATION OWS/FT	
Gravel Depth [5.00"]												
S-1 SS 18 15 (CL/ML) SILTY CLAY, Trace Sand, Pinkish Red, Moist, Medium Stiff										7-⊗		
(CL/ML) SILTY CLAY, Red, Moist, Stiff												
5 —	S-2	SS	18	16					5 7	12-⊗		
_	S-3	SS	18	18				75	4 6	12-⊗		
_	0-3			10					6	12.0		
10	S-4	ss	18	18					3 5 8	13-🛇		
								70				
_					(ML) SANDY S	SILT, Trace Clay	, Orangish Red,					
_					Moist, Very Sti		,		4			
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_					(CL/ML) SILTY Very Stiff	CLAY, Reddish	n Brown, Moist,					
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₩L				ws□	WD 🖾	BORING STARTED	ARTED 07/01/16 CAVE IN DEPTH @ 21.8'					
₩ WL(S	HW)		<u>*</u>	WL(AC	R) DRY	BORING COMPLE	MPLETED 07/01/16 HAMMER TYPE Auto					
₩ WL(SHW) ₩ WL(ACR) DRY BORING COMPLETED 07/01/16 W WL RIG Truck FOREMAN DALE PRICE									DRILLING METHOD CME 550			

CLIENT						J	JOB# BORING# SHEET						
Grimm PROJECT N	and	d Park	er	Arc	hitect	Δ	8153 RCHITECT-EN	GINEER	B-4	1	1 OF 1	EC	
Holabire SITE LOCAT			ch	ool			Grimm an		cer Archit	ect			No.
											-O- CALIBRATED PI	ENETROMETER TO	NS/FT ²
1500 In	<u>nla</u>	<u>Stree</u>	t, E	Balti ASTIN	more, City of	Baltimore, ME STATION)				ROCK QUALITY DESIGNATION & RECOVERY		
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0 _	S	S O	0	~	Topsoil Depth	[5.00"]			80	1 8	<u> </u>	<u> </u>	:
	S-1	SS 1	8	12	(CL/ML) SILTY Stiff to Hard	CLAY, Reddish	Brown, Moi	st,		3 4 6	10-⊗ 19.6-●		
	S-2	SS 1	8	18						4 5	12		
5									75	7	21.6		:
3	S-3	SS 1	8	16						5 8 11	13.6-● ≫-19		
	6-4	SS 1	8	18					70	4 6 8	14-2-15.7		
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15	S-5	SS 1	8	18					65	7 10	17-🛇 🗣-20.	8	
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20	6-6	SS 1	8	18						6 10 16	16.2-● 26-⊗		
	2 7	CC 4	0	40						12	40.2		
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-						BORING STARTED							
₩ WL(SHW) ₩ WL(ACR) DRY ₩ WL						BORING COMPLETE	MPLETED 07/01/16 HAMMER TYPE Auto FOREMAN DALE PRICE DRILLING METHOD CME 550				<u></u>		

CLIENT							JOB # BORING # SHEET			SHEET		
Grimn PROJECT	n an	d Pa	rke	r Arc	chitect		8153 ARCHITECT-ENGINEER		B-5		1 OF 1	ECO.
			0 -	l I				l	l. '4 .			
Holab SITE LOC	ATION	<u>′K-8</u>	<u>Sc</u>	<u>nooi</u>			Grimm and Par	ker Ar	rcnite	Ct	-CALIBRATED P	ENETROMETER TONS/FT ²
1500	lmla	Stre	et,	Balti	more, City of	Baltimore, N	/ID					
NORTHIN	G			EASTIN	IG S						RQD% - — -	SIGNATION & RECOVERY REC% ———
			 Î		DESCRIPTION OF M.	ATERIAL	ENGLISH	JNITS			PLASTIC V	VATER LIQUID
	9	YPE	IST. (II	(IN)	BOTTOM OF CASING	a T	LOSS OF CIRCULATION	1 200%) E	VELS N (FT)		LIMIT% CO	NTENT% LIMIT%
ОЕРТН (FT)	SAMPLE N	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	SURFACE ELEVATION		EGGG OF CINCOLATION	<u>, , , , , , , , , , , , , , , , , , , </u>	WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STANDAR	RD PENETRATION
ODEP	SAM	SAM	SAM	REC					WAT	BLO		OWS/FT
					Topsoil Depth (CL/ML) SILTY	CLAY, Trace S	Sand, Reddish		_	3	11.2 18	
_	S-1	SS	18	12	Gray, Moist, St	iff to Hard			_	4 6	★ − -	<i></i> <u></u> 40
_									_	8		34
5—	S-2	SS	18	16					- 80	14 20		
_						CLAY, Red, M	loist, Hard to Very		_	11		
_	S-3	SS	18	18	Stiff				_	17 29		46
_									_	9		
10 —	S-4	SS	18	18					 75	14 21		35-🛇
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20 —									_			
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30								F			: :	<u> </u>
	TH	E STR/	ATIFI	CATION	LINES REPRESENT	T THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.					AY BE GRADUAL.	
-						BORING STARTE	G STARTED 06/28/16 CAVE IN DEPTH @ 20.1'					
₩ WL(SI	HW)		<u>=</u>	WL(AC	R) DRY	BORING COMPLETED 06/28/16 HAMMER TYPE Auto						
₩ WL						RIG Truck	FOREMAN DA	LE PR	ICE	DRILL	ING METHOD HSA	

CLIENT						JOB# BORING# SHEET						
Grimm PROJECT N	and NAME	d Park	(e	r Arc	hitect	AF	8153 RCHITECT-ENGINEE	iR	B-6		1 OF 1	ECC
Holabir							Grimm and Pa		rchite	ct		
					O:t(Dalifarana MD					-O- CALIBRATED P	ENETROMETER TONS/FT ²
NORTHING	<u>nia</u>	Siree	L,	EASTIN	G S	Baltimore, MD)				ROCK QUALITY DESIGNATION & RECOVERY RQD% - — - REC% ———	
FT)	NO.	TYPE	LISI. (IIV)	RY (IN)	DESCRIPTION OF MA		ENGLIS	H UNITS	ON (FT)	9		VATER LIQUID NTENT% LIMIT%
	SAMPLE NO.	SAMPLE TYPE	SAMPLE	RECOVERY (IN)	SURFACE ELEVATIO	08 и			WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STANDAF BL	RD PENETRATION .OWS/FT
0 _					Asphalt Depth Gravel Depth [[4.00"]			80			
	S-1	SS 1	8	16		AY, Reddish Brow	vn, Moist, Stiff		_	3 5 7	12-⊗	
	S-2	SS 1	8	18						9 12 16		28:
5					(CL/ML) SILTY	CLAY, Trace Sar	nd Reddish		- 75			:\
	S-3	SS 1	8	18	Gray, Moist, Ha	ard	,		_	11 14 23		37-
10	S-4	SS 1	8	18					_ 	6 13 21		34-⊗
									- -			
	S-5	SS 1	8	18					_	11 16		36-⊗
15									- 65	20		
									-			
20	S-6	SS 1	8	18					— — 60	15 19 27		46-8
					(CL) LEAN CL	AY, Red, Moist, V	ery Hard		_			
	S-7	SS 1	8	16	(OL) LLAN OL	AT, IXOU, MOISI, V	ory riard		_	18 29		76-⊗
25			_		END OF BORI	NG @ 25'			 55	47		
									_			
=												
30 —									- 50		<u> </u>	<u>: </u>
		STRATI	FIC	ATION	LINES REPRESENT	THE APPROXIMATE B	BOUNDARY LINES B	ETWEEN SO	OIL TYPI	ES. IN-	SITU THE TRANSITION M	IAY BE GRADUAL.
ÿ wL DRY ws□ wd⊠ B						BORING STARTED	G STARTED 06/30/16 CAVE IN DEPTH @ 22.8'					
₩ WL(SHV	N)	1	<u> </u>	WL(AC	R) DRY	BORING COMPLETED 06/30/16 HAMMER TYPE Auto						
型 WL						RIG Truck	FOREMAN	DALE PR	ICE I	DRILI	LING METHOD HSA	

CLIENT							JOB# BORING#			SHEET		
Grimm	an NAME	d Parl	œ	Arc	hitect	8153 B-7 1 C					1 OF 1	EGO
Holabi SITE LOCA							Grimm and		Archite	ct		
					City of	Daltimana M	D				-O- CALIBRATED F	PENETROMETER TONS/FT ²
NORTHING	iiiia	Siree	<u> </u>	ASTIN	more, City of	STATION	ט				ROCK QUALITY DESIGNATION & RECOVERY RQD% - — - REC% ———	
		/PE	(III) . I O	<u>S</u>	DESCRIPTION OF MA		ENG	LISH UNITS				NATER LIQUID LIMIT%
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAIMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATION		LOSS OF CIRCUL	ATION Z	WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STANDA	RD PENETRATION .OWS/FT
0 _	0)	0) (,		Asphalt Depth	[6.00"]		- 80°	80		: :	
\exists	S-1	SS 1	8	18	Gravel Depth [8 (CL) LEAN CLA Gray, Moist, Mo	3.00"] AY, Reddish Bro edium Stiff to Ha	wn Reddish ard			2 3 4	7-⊗	
	S-2	SS 1	8	18					7.	4 7 11	18-⊗:	
5									75			
	S-3	SS 1	8	16						7 12 23		35
10	S-4	SS 1	8	18					70	10 13 21		34-×
	0.5	00 4	_	40	(CL/ML) SILTY Brown, Moist, \	CLAY WITH SA Very Stiff	AND, Reddish			8	hr 6	
15	S-5	SS 1	8	18					65	11 14	25-⊗	
				i	(CL) LEAN CLA	AY, Reddish Bro	wn, Moist, Har	d				
20	S-6	SS 1	8	18					60	10 17 31		48-8
	S-7	SS 1	6	14						19 37		87/10-⊗
25					END OF BORI	NG @ 25'			55	50/4	: :	: : :
\equiv												
30 —									50			
	THE	STRAT	FIC	ATION	LINES REPRESENT	THE APPROXIMATE	IMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.				MAY BE GRADUAL.	
$\begin{tabular}{lll} &\begin{tabular}{lll} $\begin{tabular}{lll} $\begin{tabular}{lll}$					WD⊠	BORING STARTED	G STARTED 07/01/16 CAVE IN DEPTH @ 21.9'					
₩ WL(SH	IW)	-	<u> </u>	NL(AC	R) DRY	BORING COMPLETED 07/01/16 HAMMER TYPE Auto						
₩ WL						RIG Truck	FOREMA	N DALE F	PRICE	DRIL	LING METHOD HSA	

CLIENT					JOB# BORING#					
Grimm a	and P	arke	er Arc	chitect	8153 B-8 1 (ECC
Holabird						Grimm and Pa		tect	T	
				0	D. Id.				-O- CALIBRATED P	PENETROMETER TONS/FT ²
NORTHING	ia Str	eet,	EASTIN	imore, City of	Baltimore, MD)			ROCK QUALITY DE: RQD%	SIGNATION & RECOVERY REC% ———
(FT)	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF M.		ENGLIS		BLOWS/6"		NATER LIQUID LIMIT%
O DEPTH (FT)	SAMPL	SAMPL	RECOV	SURFACE ELEVATIO			WATE 85		⊗ STANDAF BL	RD PENETRATION .OWS/FT
<u> </u>				Topsoil Depth (CL/ML) SILTY	CLAY WITH SAN	ND, Reddish	"	3		
s-	·1 SS	18	12	Gray, Moist, M	edium Stiff to Very	y Stiff		4 4	8	
S-	·2 SS	18	18				80	6 11 17		28: ⊗:
<u> </u>					CLAY, Trace Sar	nd, Reddish				
s-	-3 SS	18	18	Gray, Moist, Ha	ard			10 16 23		39-8
S-	4 SS	18	18				75	9 16 19		35-⊗
1				(CL) LEAN CL/ to Very Hard	AY, Reddish Brow	n, Moist, Hard		7		
S-	5 SS	18	18				70	13		33-🛇
s-	-6 SS	18	18					10 18		44-⊗
20							65	26		
S-	7 SS	18	18				60	17 31 48		79-⊗
				END OF BORI	NG @ 25'					
=										
30 —							55			
		RATIFI	CATION	I LINES REPRESENT	IT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRAD					1AY BE GRADUAL.
₩L DR			ws□	WD⊠	BORING STARTED 06/29/16 CAVE IN DEPTH @ 22.7'					
₩ WL(SHW) W WL)	<u> </u>	WL(AC	R) DRY	BORING COMPLETED 06/29/16 HAMMER TYPE Auto					
→ WL					RIG Truck	FOREMAN [ALE PRICE	1 DRIL	LING METHOD HSA	

CLIENT						J	OB#		BORING #		SHEET		
Grimm	n an	d Paı	ke	r Arc	chitect	I A	815	3 NGINEER	B-	9	1 OF 1	ECC	
Holabi							Grimm a	nd Park	ker Arch	tect	i	100	
							_				-O- CALIBRATED F	PENETROMETER TONS/FT ²	
NORTHING	<u>mla</u> ₃	Stre	et,	Balti EASTIN	more, City of	Baltimore, MI)				ROCK QUALITY DESIGNATION & RECOVERY RQD% - — - REC% ——		
		М	N).	<u> </u>	DESCRIPTION OF M.			ENGLISH U		£.	LIMIT% CO	VATER LIQUID	
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	BOTTOM OF CASINO		LOSS OF CIR	CULATION	WATER LEVELS	ELEVATION (FT) BLOWS/6"			
0	SAI	SAI	SAI	RE	Topsoil Depth				<u>≸</u>		BL	.OWS/FT	
					(CL/ML) SILTY	CLAY, Reddish	Gray, Mois	st,		6			
	S-1	SS	18	18	Very Stiff to Ve	ry Hard				7 9	16-⊗		
5	S-2	ss	18	18					75	7 13 15	28	≫ :	
											: : ;	/ : : :	
	S-3	ss	18	18						7 10 15	25-&	\	
-	S-4	ss	18	18						8 12 16	28	\	
10									70				
15	S-5	ss	18	18					65	11 14 21		35-⊗	
	_									7			
20	S-6	SS	18	18					60	19 20		39-⊗	
\exists													
	S-7	ss	17	16						16 37 50/5		87/11-	
25 —					END OF BORI	NG @ 25'		\X	иии ₅₅	30/3			
3													
30 —									50				
						TUE ADDD 51/11/1-	DOLINE : T.		UEEN 6			41V25 00 40VV	
									VEEN SOIL T		S. IN-SITU THE TRANSITION MAY BE GRADUAL.		
₩ WL(SHW) ₩ WL(ACR) DRY						BORING STARTED BORING COMPLETI							
ÿ WL(ACR) DRY						RIG Truck	FOR	EMAN DA	LE PRICE	DRIL	LING METHOD HSA		

Grimm and Parker Architect PROJECT NAME							JOB # BORING # SHEET 8153 B-10 1 OF 1				-			
Grimm	n an	d Par	ke	r Arc	chitect		81 ARCHITECT	53 -ENGINEER	<u> </u>	B-10		1 OF 1	En	0
Holabi								and Par	ker Ar	<u>chite</u>	ct _			- N
												-O- CALIBRATED P	ENETROMETER	R TONS/FT ²
1500 I	<u>mla</u> ₃	Stree	et,	Balti EASTIN	more, City of	Baltimore, MI	<u>D</u>					ROCK QUALITY DES		ECOVERY
		J.	ST. (IN)	(IN)	DESCRIPTION OF M. BOTTOM OF CASING		1000.05.0	ENGLISH (V (FT)			VATER NTENT%	LIQUID LIMIT%
БЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATION		LUSS OF C	IRCULATION	WATER EVEN	ELEVATION (FT)	BLOWS/6"	⊗ STANDAF	RD PENETRATIO	ON
0 _	.,	-	•		Topsoil Depth	[5.00"]				80		: :	: :	:
=	S-1	ss	18	18	Stiff to Very Sti	CLAY, Reddish	Brown, N	loist,		-	3 6 5	11-⊗		
	S-2	ss	18	16						- - -75	7 10 13	23-⊗		:
5										- /5				:
S-3 SS 18 18										-	6 10 14	24-⊗		:
S-4 SS 18 18										- -70	8 10 15	25-		:
										-				
	(CL/ML) SILTY Brown, Moist, \						and, Redo	lish		-	3	19_		:
15	S-5	SS	18	16						- 65	12	18		
					(CL) LEAN CL/ Hard	AY, Red, Moist, Y	Very Stiff	to Very		-				
20	S-6	ss	18	16						- -60	9 13 16	29	+&	:
										-				
	S-7	ss	18	18						-	13 23			54-8
25					END OF BORI	NG @ 25'				- 55	31	: :	<u>:</u> :	<u> </u>
3									E	-				
										-				: : :
20									E	- - 50				:
30]									F	50		: :	: :	•
THE STRATIFICATION LINES REPRESENT THE AF						THE APPROXIMATE	PROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.							
Π.						BORING STARTED								
VIIIV						BORING COMPLETED 06/29/16 HAMMER TYPE Auto								
₩L(ACR) DRY						RIG Truck FOREMAN DALE PRICI				CE	E DRILLING METHOD HSA			

Grimm and Parker Architect PROJECT NAME							JOB# BORING# SHEET						
Grimm	an	d Par	ке	r Arc	chitect		8153 ARCHITECT-ENGI	NEED	B-1′	<u> </u>	1 OF 1	EC	2
Holabi SITE LOCA							Grimm and		Archite	ect			
											-O- CALIBRATED P	ENETROMETER T	ONS/FT ²
1500 II	mla	Stree	t,	Balti EASTIN	more, City of	Baltimore, M	D				ROCK QUALITY DES		OVERY
		ш	L Ê	2	DESCRIPTION OF M	ATERIAL	ENG	LISH UNIT			LIMIT% CO	VATER NTENT%	LIQUID LIMIT%
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	BOTTOM OF CASING		LOSS OF CIRCUL	ATION M	WATER LEVELS ELEVATION (FT)	BLOWS/6"		RD PENETRATION	- ∆
O	SAN	SAN	SA SA SA	REC	Topsoil Depth			N//	WA-	BLO	BL	OWS/FT	
=	0.4	00	_	10	(CL/ML) SILTY	CLAY, Reddish Stiff to Very Stiff	Tan Reddish			4	45.00		:
=	S-1	SS /	8	18	BIOWII, MOISI, S	Sun to very Sun				6 9	15-💝 16.9		
	S-2	SS	8	18					80	5 8 10	18-17.5		•
5										6			:
=	S-3	SS	8	18						6 7 8	15-(-15.5		
S-4 SS 18 18									- 75 	5 9 11	12.9-● ⊗-20		:
10													:
					(CL/ML) SILTY	CLAY, Trace S	and, Reddish						:
7		_			Brown, Moist, V					5			• • •
15	S-5	SS	8	18					70	7 9	14.3-•\$-16		
=													
彐					(CL) LEAN CL/ to Very Hard	AY, Reddish Bro	own, Moist, Har	d					:
	S-6	SS ·	8	18					65	8 13 20	18.1-●	33-&	
20									F				:
													:
=	S-7	SS -	8	16					60	12 23	18.3-●	58	\rightarrow
25 END OF BORI						NG @ 25'			-	35			:
3									E				•
30 —									55				:
									L		<u> </u>	: :	:
	THI	E STRAT	IFIC	CATION	LINES REPRESENT	THE APPROXIMATE	DIXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.						
П						BORING STARTED							
VIIIV						BORING COMPLETED 06/29/16 HAMMER TYPE Auto							
₩L(ACR) DRY						RIG Truck FOREMAN DALE PRICE DRILLING METHOD HSA							

CLIENT					J	JOB # BORING # SHEET 8153					
Grimm a	and P	arke	er Arc	chitect	I A	8153 RCHITECT-ENGINEE	R	B-12		1 OF 1	ECO
Holabird						Grimm and Pa		rchite	ct		
				O	.	_				-O- CALIBRATED PI	ENETROMETER TONS/FT ²
NORTHING	ia Str	eet,	EASTIN	more, City of	Baltimore, IVIL)				ROCK QUALITY DES	REC% ———
	, La	IST. (IN)	(NI)	DESCRIPTION OF M. BOTTOM OF CASING		ENGLIS	H UNITS	VELS			VATER LIQUID NTENT% LIMIT%
DEPTH (FT)	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATION		LOSS OF CIRCULATI	ON Z	WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STANDAR	D PENETRATION OWS/FT
0 _	, ,,	"		Topsoil Depth	[6.00"]			80		: :	: : :
s-	1 SS	18	18		SAND, Light Bro Moist, Medium D			_	4 6 7	13-⊗	
	·2 SS	18	18					_	9 10 12	22-⊗	
5				(CL/ML) SILTV	CLAV Paddish	Brown Moiet		 75	12		
s-	-3 SS	18	16	Stiff to Very Sti	CLAY, Reddish Brown, Moist,					13-Ø	
S-	-4 SS	18	18					_ _ 70	5 7 9	16-🛇	
10											
				(ML/CL) CLAY Stiff	EY SILT, Reddis	h Gray, Moist,		_	5		
15 S-	5 SS	18	18					— - 65	7 8	15-⊗	
					AY, Reddish Brov	wn, Moist, Stiff		_			
S-	·6 SS	18	18	to Very Stiff				_	4 6 8	14-⊗	
20								— 60 — ⊈			
								=	6		
S-	7 SS	18	18	4110ED DEEL	041 0 051			 55	9 13	22-⊗	
				AUGER REFU	SAL @ 25			_			
_								-			
30								 50			
		RATIFI			IT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.						
<u></u> WL 22.			ws□	WD⊠	BORING STARTED 06/29/16 CAVE IN DEPTH @ 22.3'						
₩ WL(SHW) ₩ WL)	<u></u>	WL(AC	R) 21.9	BORING COMPLETED 06/29/16 HAMMER TYPE Auto						
→ WL					RIG Truck	FOREMAN [)ALF PR	ICE I	DRIL	LING METHOD HSA	

Grimm and Parker Architect PROJECT NAME							JOB# BORING# SHEET					
Grimn	n an	d Pa	rke	r Arc	chitect		8153 RCHITECT-ENGIN	IEED	B-13	3	1 OF 1	ECO
Holabi							Grimm and		Archite	ect		
											-O- CALIBRATED P	ENETROMETER TONS/FT ²
NORTHING	mla ^G	Stre	et,	Balti EASTIN	more, City of	Baltimore, ME)				ROCK QUALITY DES	REC% ——
		ш		<u> </u>	DESCRIPTION OF M.	ATERIAL	ENG	LISH UNIT			LIMIT% CO	VATER LIQUID
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	BOTTOM OF CASING		LOSS OF CIRCUL	ATION 🚾	WATER LEVELS ELEVATION (FT)	BLOWS/6"		RD PENETRATION
0 _	SAI	SAI	SAI	RE	_ Topsoil Depth				§ 80	BL(BL	OWS/FT
\exists	S-1	ss	18	16	(CL/ML) SILTY	CLAY, Reddish Stiff to Very Stiff	Gray Reddish			5 7 8	15-⊗	
\exists	S-2	ss	18	18						5 8	19-⊗	
5 -				10					75	11		
	S-3	SS	18	18						7 9 11	20-🛇	
10	S-4 SS 18 18								70	8 11 13	24-	
\exists										5		
15	S-5	SS	18	18					65	7 10	17-🛇	
					(ML/CL) CLAY	EY SILT WITH S	AND, Gray,					
	S-6	ss	18	18	Moist, Very Stil	f				5 9	19-⊗	
20									60	10		
S-7 SS 18 18 25 END OF BOR						NG @ 25'			55	5 9 12	21-⊗	
						110 @ 20						
30 —									50			
	TH	E STRA	TIFI	CATION	LINES REPRESENT	THE APPROXIMATE I	OXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.					AY BE GRADUAL.
						BORING STARTED						
VIIIV —						BORING COMPLETE	G COMPLETED 06/29/16 HAMMER TYPE Auto					
₩ WL(ACK) DR1						RIG Truck	FOREMA	N DALF	PRICE	DRIL	LING METHOD HSA	

Grimm and Parker Architect PROJECT NAME							JOB# BORING# SHEET						
Grimm PROJECT N	and NAME	d Park	er	Arc	hitect		8153 ARCHITECT-ENGII	NEER	B-14	ļ	1 OF 1	E	CC
Holabir	d P	K-8 S	ch	ool			Grimm and	Parker A	Archite	ect			
					City of	Daltimaana Mi	_				-O- CALIBRATED I	PENETROMET	ER TONS/FT ²
NORTHING	<u>nia</u>	Stree	E.A	ASTIN	more, City of	STATION	<u>) </u>				ROCK QUALITY DE RQD%		RECOVERY
Æ	9	TYPE		- 1	DESCRIPTION OF MA BOTTOM OF CASING		ENG	LISH UNITS	EVELS ON (FT)			WATER DNTENT%	LIQUID LIMIT%
	SAMPLE NO.	SAMPLE TYPE		RECOVERY (IN)	SURFACE ELEVATIO	N 80			WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STANDA B	RD PENETRA' LOWS/FT	TION
0 _					Asphalt Depth	[4.00"]		านาน	80			: :	
	S-1	SS 1	8	16	(ML/CL FILL) C	CLAYEY SILT WI Roots, Reddish			<u>-</u> -	2 3 4	7-\&		
	S-2	SS 1	В	16		CLAY, Dark Yel f	lowish Brown,			6 9 8	17-⊗		
						ND, Trace Clay,	Grav. Moist.						:
S-3 SS 18 18 Dense						,,,	, ,		<u>-</u> -	11 15 17		32	:
S-4 SS 18 18 Very Stiff						CLAY, Reddish	Gray, Moist,			5 7 12	19-⊗		
10													
15	S-5	SS 1	8	18					 65	9 10 14	24-		
				-	(CL) LEAN CLA	AY, Reddish Bro	wn. Moist. Ver	,	<u> </u>				
	S-6	SS 1	В	18	Stiff to Hard	,	,,		<u> </u>	14 12	28		
20									<u></u> 60 	16			
S-7 SS 18 18									 55	13 19 27			µ6-⊗ :
END OF BOR						NG @ 25'			_				:
								-	<u> </u>				:
30 —													
⊣								1 F	—	ı I	<u> </u>		·
	THE	STRATI	FICA	ATION	LINES REPRESENT	THE APPROXIMATE	DXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.						
ÿ WL DRY WS□ WD⊠ BORIN					WD⊠	BORING STARTED	STARTED 06/30/16 CAVE IN DEPTH @ 22.4'						
VIIIV						BORING COMPLET	ORING COMPLETED 06/30/16 HAMMER TYPE Auto						
<u> </u>						RIG Truck	FOREMA	N DALE P	RICE	DRILL	LING METHOD HSA		

CLIENT							JOB#	BORING #	ŧ		SHEET		
Grimn PROJECT	n an	d Pa	rke	r Arc	chitect		8153 ARCHITECT-ENGINEEI	SV	VM-	1	1 OF 1	E	CC
Holab SITE LOC	ird F	<u> K-8</u>	Sc	hool			Grimm and Pa	rker Arc	hited	ct	<u> </u>		
1500	lmla	Stro	ωt	Ralti	more City of	Raltimore M	ID				-O- CALIBRATED P	ENETROME	ER TONS/FT²
NORTHIN	G	Olic		EASTIN	more, City of	STATION	טו				ROCK QUALITY DES		
		Щ	N.	<u> </u>	DESCRIPTION OF M	MATERIAL	ENGLISH		(FT)		LIMIT% CO	VATER NTENT%	LIQUID LIMIT%
(FT)	NO NO	ETYF	E DIS	ΈRΥ	BOTTOM OF CASIN	G 💮	LOSS OF CIRCULATION	N ZWZ NG	NOIL	.9/9	X		
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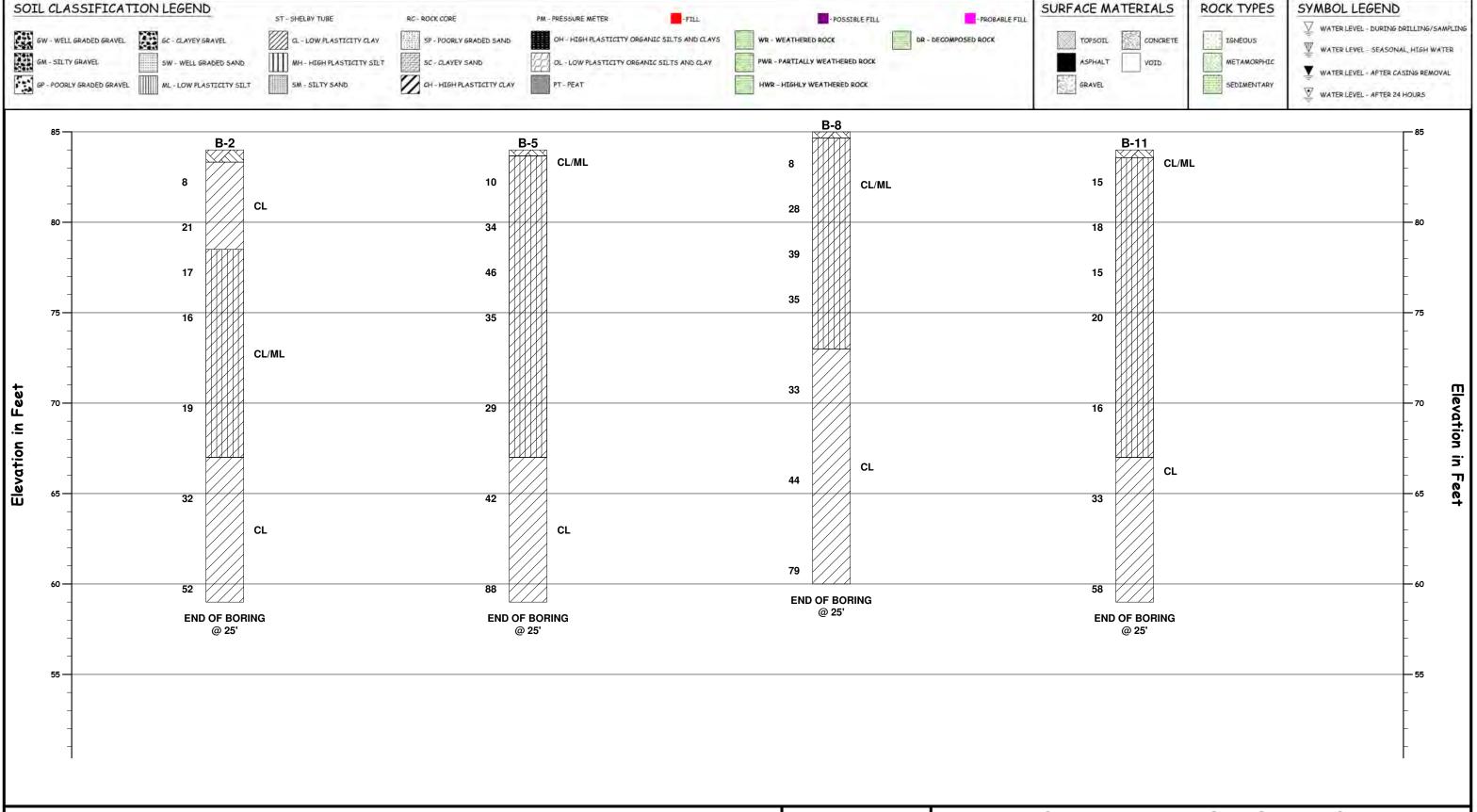
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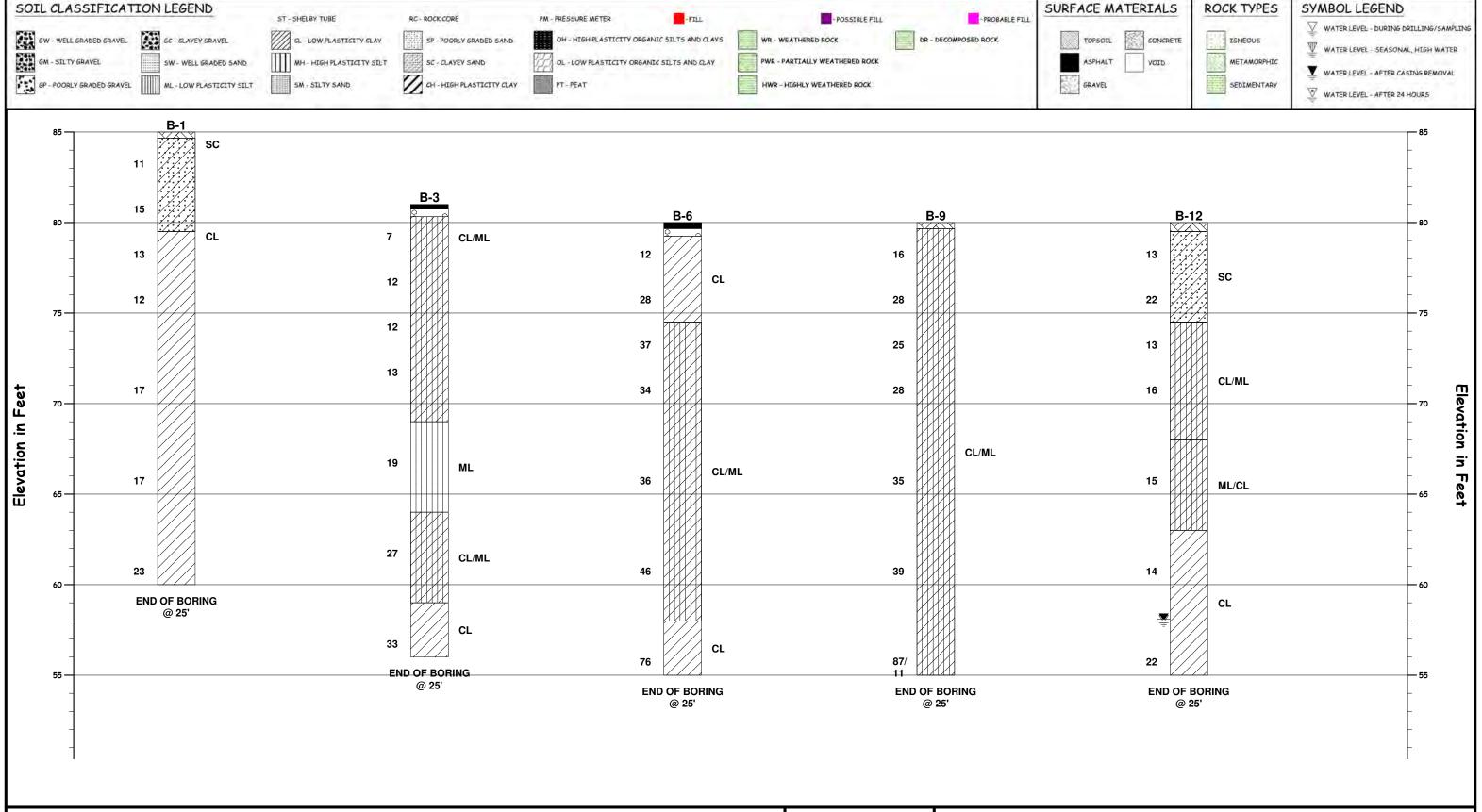
- 1 SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.
- 2 PENETRATION TEST RESISTANCE IN BLOWS PER FOOT (ASTM D1586).
- 3 HORIZONTAL DISTANCES ARE NOT TO SCALE.



GENERALIZED SUBSURFACE SOIL PROFILE

Holabird PK-8 School
Grimm and Parker Architect

1500 Imla Street, Baltimore, City of Baltimore, MD



NOTES:

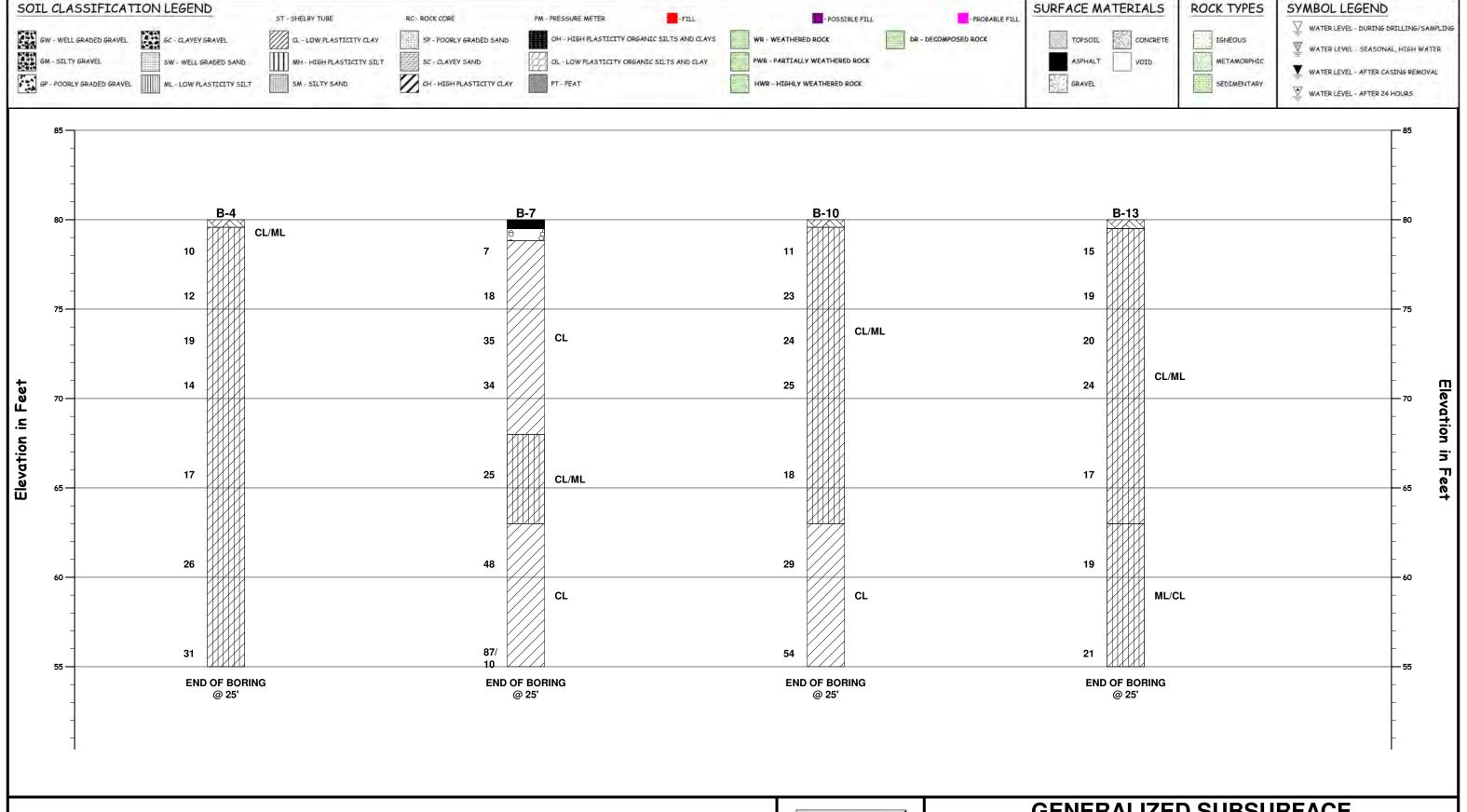
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GENERALIZED SUBSURFACE SOIL PROFILE

Holabird PK-8 School
Grimm and Parker Architect

1500 Imla Street, Baltimore, City of Baltimore, MD
PROJECT NO.: 8153 DATE: 7/27/2016 VERTICAL SCALE: 1"=5"



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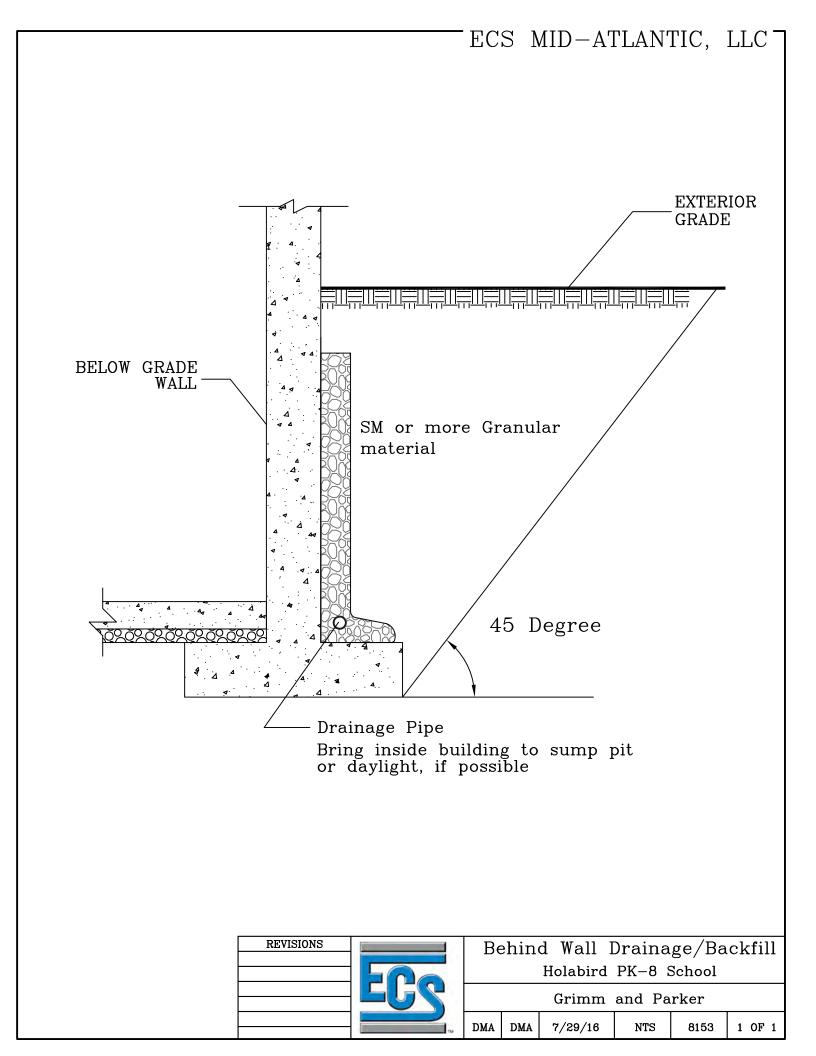
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GENERALIZED SUBSURFACE SOIL PROFILE

Holabird PK-8 School
Grimm and Parker Architect

1500 Imla Street, Baltimore, City of Baltimore, MD



SECTION 02 41 00 - DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building demolition excluding removal of hazardous materials and toxic substances.
- B. Abandonment and removal of existing utilities and utility structures.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- C. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- E. Demolish: Tearing down, destruction, breakup, razing or removal of the whole or part of a building or structure, or free standing machinery or equipment that is directly related to the function of the structure.
- F. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.

1.3 OWNERSHIP OF REMOVED MATERIALS

- A. Prior to demolition operations, the Owner reserves the right to salvage any items that otherwise would be part of the demolition; the Owner will remove equipment, material and fixtures they wish to retain.
- B. After demolition operations begin, equipment, material and fixtures indicated for demolition become the property of the Contractor to be removed, salvaged or disposed of by the Contractor.

1.4 RELATED REQUIREMENTS

- A. Section 01 10 00 Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 50 00 Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 70 00 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 01 74 19 Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.5 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Predemolition Phtographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations.
- C. Site Plan: Showing:

- 1. Areas for temporary construction and field offices.
- D. Qualification Data: For refregerant recovery technician.
- E. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

F. Informational Submittals:

- 1. Submit shop drawings showing shoring, bracing, and temporary supports for the existing and re-installed structure as appropriate.
- 2. Design of Bracing and Support: Submit engineering calculations of shoring and bracing designs.
 - a. Shoring, bracing and support shall be designed to maintain existing lines and surfaces without deflection during work; design shall be in accordance with gravity dead, live and wind load resistance requirements of the jurisdiction.
 - b. Design shall be sufficient for existing and new material loads and anticipated construction loads.
 - c. Stresses on supporting structure shall not exceed safe, commonly allowable stresses for the materials in consideration of their age and conditions.
- 3. Provide certification of professional engineer responsible for the preparation or review of the shop drawings and design calculations.
- 4. Construct shoring, bracing and support in accordance with design submittal and proper and standard construction practice.

G. Closeout Submittals:

- 1. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- 2. Inventory: Submit a list of items that have been removed and salvaged.
- 3. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- 4. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
- B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.

- E. Predemolition Conference: Conduct conference at Project site to comply with requirements in the Contract Documents.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.7 PROJECT CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Storage or sale of removed items or materials on-site is not permitted.
- D. 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 -- NOT USED

PART 3 EXECUTION

3.1 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. 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.
 - 3. Provide, erect, and maintain temporary barriers and security devices.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 5. Do not close or obstruct roadways or sidewalks without permit.
 - 6. 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.
 - 7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. 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.

3.2 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.

3.3 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 Waste Management.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 02 41 13 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Requirements of the General Provisions apply to all work under this section.
- B. Baltimore City Department of Public Works Standard Details for Construction dated March 2008 and as amended.
- C. Throughout the specifications, types of materials may be specified by manufacturer's name and catalogue number in order to establish standards of quality and performance and not for the purpose of limiting competition. Alternate methods and/or materials may be submitted to the Architect for consideration. Those judged to be equal to that specified will receive written approval.

1.2 SUMMARY

- A. This Section requires removal and disposal, off site, of the following:
 - 1. Entrance drive, parking structures, utilities, and adjacent site improvements to limits indicated on drawings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Summary of Work" for use of the building and phasing requirements.
 - 2. Division 2 Section "Selective Structure Demolition" for cutting and patching procedures for selective demolition operations.
 - 3. Division 1 Section "Construction Progress Documentation" for demolition schedule requirements.
 - 4. Division 1 Section "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures for selective demolition operations.
 - 5. Division 1 Section "Construction Waste Management and Disposal" for LEED requirements relating to demolition.
 - 6. Division 32 Section "Planting" for protecting trees remaining on-site.
 - 7. Division 31 Section "Site Clearing" for site clearing and removing above, and below, grade improvements.
 - 8. Division 31 Section "Excavation and Filling" for soil materials, excavating, backfilling, and site grading.
 - 9. Division 23 Sections for cutting, patching, or relocating mechanical items.
 - 10. Division 26 Sections for cutting, patching, or relocating electrical items.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Proposed schedule of operations coordination for shutoff, capping, and continuation of utility services as required.

- 1. Provide a detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
- C. Photographs of existing adjacent structures and site improvements.

1.4 JOB CONDITIONS

- A. Demolition Phasing
 - 1. The contractor shall prepare and submit a demolition/construction staging plan to the Baltimore City Public Schools for approval prior to beginning any construction.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of structures to be demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of demolition work.
- C. Salvage Materials: Items of salvable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
 - 1. Storage or sale of removed items will not be permitted on site.
 - 2. Owner's salvage list will be provided at Pre-Bid Meeting.
- D. Explosives: Use of explosives will not be permitted.
- E. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- F. Protections: Ensure safe passage of persons around area of demolition. Conduct operations to prevent damage to adjacent buildings, structures, and other facilities and injury to persons.
- G. Damages: Promptly repair damages caused to adjacent facilities by demolition operations.
- H. Utility Services: Maintain existing utilities indicated to stay in service and protect against damages during demolition operations.
 - 1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
- I. Utility Services: Refer to Division 23 and 26 sections for disconnecting, removing, and capping of utility services. Do not start demolition work until utility disconnections have been completed and verified in writing.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 DEMOLITION

- A. Pollution Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air. Comply with governing regulations pertaining to environmental protection.
 - 1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

3.2 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Remove weekly from site accumulated debris, rubbish, and other materials resulting from demolition operations.
 - 1. Burning of combustible materials from demolished structures will not be permitted on site.
- B. Removal: Transport materials removed from demolished structures and legally dispose of off site.

END OF SECTION

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of building or structure.
- B. Related Sections include the following:
 - 1. Division 1 Section "Summary" for use of premises, and phasing, and Owner-occupancy requirements.
 - 2. Division 1 Section "Site Procedures and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 3. Division 1 Section "Execution Requirements" for cutting and patching procedures.
 - 4. Division 1 Section "Construction Waste Managment and Disposal".

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- D. Demolish: Tearing down, destruction, breakup, razing or removal of the whole or part of a building or structure, or a free standing machinery or equipment that is directly related to the function of the structure.
- E. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.

1.3 SUBMITTALS

A. Predemolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations.

1.4 OUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.
- E. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Administrative Requirements."

1.5 PROJECT 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 Abatement: Coordinate hazardous materials management with abatement trades, as required. [OSHA 1926.850(e); ANSI A10.6]
 - 1. Determine lead concentrations in any suspect surface coatings, structural steel rust inhibitors and ceramic tiles prior to selective demolition. Coordinate lead management with abatement trade, as required. [29 CFR 1926.850(e) and 1926.62(d)(2)]
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
- G. Refer to drawing documents for items to be removed and salvaged for reuse in new construction.

1.6 WARRANTY

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
- E. Survey of Existing Conditions:
 - 1. Record existing conditions by use of preconstruction photographs.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
- F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
 - a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

- A. Items to be Salvaged: Refer to drawings for items indicated to be salvaged and reinstalled.
 - 1. All items to be salvaged and reinstalled into new building are to be cleaned and stored until schedule allows reinstallation.
 - 2. All items to be salvaged and turned over to the Owner are to be cleaned and delivered to the location provided by the Owner.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 3. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1 Section "Temporary Facilities and Controls."
- D. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

- 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
- 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
- 5. Maintain adequate ventilation when using cutting torches.
- 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
- 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- 9. Dispose of demolished items and materials promptly.
- 10. Pollution Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air. Comply with governing regulations pertaining to environmental protection.
- 11. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- 12. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. Roofing:

- 1. Before commencing with cutting and patching of roofing, consult with the Owner regarding the existence of an outstanding roofing warranty. If such a warranty exists, obtain written approval of the methods to be used from the roofing manufacturer who issued the warranty so as not to affect the value of the warranty.
- 2. Cut, patch, repair and extend roofing and installation as follows:
 - a. Where disturbed or damaged by alteration Work or activities related to same.
 - b. Where new Work connects to existing construction.
- 3. Roof areas penetrated for alterations shall be protected against damage and leakage by the Contractor performing the Work. Roof openings shall not be left uncovered or unprotected overnight or during any periods of rainy or inclement weather.
- 4. Remove loose aggregate, if applicable, and store away from work area.

- 5. Work shall be performed in a manner to provide for permanent water-tight splice or repair.
- 6. Roof repair and alteration Work and materials shall match existing roofing materials and construction.
- 7. Upon completion and inspection of splice or repair Work, remove debris from the roof and replace the aggregate as required.
- 8. Protect undisturbed existing and newly repaired roofing subject to traffic and damage.
- 9. Upon completion of demolition operations requiring the shoring of roof structure, manufacturer holding the existing warranty shall inspect all base flashings and roofing membrane; perform all repairs required following demolition operations.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.
 - 1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.
- F. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.
- G. Hazardous Materials:
 - 1. Coordinate hazardous materials management with abatement trades, as required." [OSHA 1926.850(e); ANSI A10.6]
 - 2. Determine lead concentrations in any suspect surface coatings, structural steel rust inhibitors and ceramic tiles prior to selective demolition. Coordinate lead management with abatement trade, as required. [29 CFR 1926.850(e) and 1926.62(d)(2)]
 - 3. CAUTION: Lamp ballasts are regulated toxic substances. PCB and DEHP WASTES shall be salvaged. [EPA 40 CFR 761]
 - 4. CAUTION: Hydraulic door closures may contain PCB oils. Recover hydraulic door closures intact for salvage and coordinated delivery to Owner. [EPA 40 CFR 761 and 29 CFR 1926.850(e)]
 - 5. CAUTION: Fluorescent tubes, batteries and tilt-switch thermostats contain MERCURY. [29 CFR 1926.850(e)]

3.6 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 in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

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

END OF SECTION

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.2 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.3 REFERENCE STANDARDS

- A. ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 301 Specifications for Structural Concrete; 2010 (Errata 2012).
- C. ACI 318 Building Code Requirements for Structural Concrete and Commentary; 2011.
- D. ACI 347R Guide to Formwork for Concrete; 2014.
- E. ASME A17.1 Safety Code for Elevators and Escalators; 2013.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on void form materials.
- C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.
 - 1. Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork; stamped and signed by engineer registered in the State of Maryland.
 - 2. Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
 - 3. Indicate location of all slab joint types.
- D. LEED Submittals: If any wood or wood-based form materials, including supports, are permanently installed in the project, submit documentation required for sustainably harvested wood as specified in Section 01 60 00.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.
 - 1. Maintain one copy of standards on project site.

PART 2 PRODUCTS

2.1 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.
- D. Comply with relevant portions of ACI 347, ACI 301, and ACI 318.

2.2 FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

2.3 REMOVABLE PREFABRICATED FORMS

A. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 2 inches thick.

2.4 FORMWORK ACCESSORIES

- A. Form Ties: Snap-off type, galvanized metal, fixed length, cone type, with waterproofing washer, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
- C. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding of concrete finish coatings, or affect color characteristics of concrete finish coatings.
- D. Corners: Chamfered, rigid plastic or wood strip type; 3/4 x 3/4 inch size; maximum possible lengths.
- E. Dovetail Anchor Slot: Galvanized steel, at least 22 gage, 0.0299 inch thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- F. Flashing Reglets: Galvanized steel, at least 22 gage, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- H. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.
- I. Waterstops: Preformed mineral colloid strips, 3/4 inch thick, moisture expanding.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Provide chamfer strips on external corners of beams, joists, and columns.
- D. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
- E. Coordinate this section with other sections of work that require attachment of components to formwork.
- F. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.4 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
 - 1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
 - 2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless more strigent tolerances are required within the Contract Documents.
- B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

3.8 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
- C. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.9 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03 11 19 - INSULATING CONCRETE FORMING (ICF)

PART 1 GENERAL

1.1 SUMMARY

- A. Supply & installation of insulated concrete forms, installation of reinforcing steel and placement of concrete within formwork.
- B. Adequate bracing and falsework shall be provided by the Installing Contractor to comply with all applicable Codes.

1.2 SCOPE OF WORK

- A. ICF installer to furnish all labor, materials, tools and equipment to perform the installation of insulated concrete form wall assembly as per the construction documents and specification.
- B. Furnish all labor to include placement of reinforcing steel within forms, placement of concrete into forms, and final cleanup.

1.3 RELATED SECTIONS

- A. Section 03 20 00 Concrete Reinforcement.
- B. Section 03 30 00 Cast-In-Place Concrete.
- C. Division 04 20 00 Masonry.
- D. Division 5 Metals.
- E. Section 06 17 00 Engineered Framing Systems.
- F. Division 7 Air Barriers.
- G. Section 07 11 00 Bituminous Damproofing.
- H. Section 07 13 00 Sheet Waterproofing.
- I. Section 07 42 13 Metal Wall Panels.
- J. Section 07 95 13 Expansion Joint Cover Assemblies.
- K. Division 8 Aluminum Storefront and Curtainwall.
- L. Section 09 21 16 Gypsum Board Assemblies.
- M. All penetration from Mechanical, Electrical, and Plumbing work.

1.4 REFERENCES

K. UBC 26-3

A.	ACI 301	Specifications for Structural Concrete
B.	ACI 305R	Guide to Hot Weather Concreting
C.	ACI 306R	Guide to Cold Weather Concreting
D.	ACI 318	Building Code Requirements for Reinforced Concrete
E.	ACI 332	Guide to Residential Cast-in-Place Concrete Construction
F.	ASTM C236	Steady State Thermal Performance of Building Assemblies
G.	ASTM C473	Physical Testing of Gypsum Board Products & Gypsum Lath
H.	ASTM D1761	Mechanical Fasteners in Wood
I.	ASTM E84	Surface Burning Characteristics of Building Materials
J.	ASTM 2634	Flat Wall Insulating Concrete Form (ICF) Systems

Uniform Building Code Standard Room Fire Test

1.5 DEFINITIONS

- A. EPS- Acronym for "Expanded Polystyrene" when referencing the insulating foam component of the insulated concrete form.
- B. ICF- Acronym for "Insulated Concrete Form".
- C. ICF Alignment System- a form alignment & scaffold system designed exclusively for use with insulated concrete forms.
- D. Trained Installer- An installation contractor, who has received instructional training in the installation of insulated concrete forms.
- E. Technical Associate or Advisor- A technical representative, usually a staff member of a ICF Manufacturer or Distribution Firm, who has received instructional training in the installation of insulating forms (as administered by manufacture) and is in the capacity of supervising or overseeing an installation crew on site.
- F. Window or Door Opening Buck- a pre-manufactured or site constructed frame assembly consisting of wood, plastic or metal material (or combination thereof) used to frame a rough opening within the forming system that will retain concrete around the opening. The frame can also provide for subsequent anchorage of doors and windows within the wall assembly.

1.6 SYSTEM DESCRIPTION / PERFORMANCE REQUIREMENTS

- A. Insulated concrete wall forming system shall consist of 2 flame resistant panels of expanded polystyrene (EPS) connected by either high-density polypropylene hinged pin foldable webs or EPS embedded polystyrene fastening strips interconnected with slide in format high density polypropylene web connectors.
- B. Insulating concrete form system shall provide a minimum insulation panel thickness of 2 5/8-inches (66.7mm) throughout ALL forms and panels forming the form system product inventory (with exception of variance required for brick ledge, tapered top forms and wall areas requiring a one sided ICF with exposed concrete finish on one face of wall).
- C. All web fastening strips to run full height of form and be fitted top and bottom with reversible fitting, "triple-tooth" interlocking mechanisms to enable positive vertical interlocking of forms with each other. Wall system webs to provide min. 1 ½" (38mm) wide fastening strips @ 8" (200mm) o/c approx 1/2" (13mm) below wall face for full wall height to facilitate finish fastening of both interior and exterior finishes.
- D. Full height fastening strips also to be positioned within corner forms to provide capability of connecting finishes full height within 4"(100mm) or less of all corner conditions.
- E. EPS foam panels shall be molded with interlocking teeth along top of all panels.
- F. Wall system to provide min. 4", 6", 8", or 10" wall sections (as required) at all locations throughout wall area.
- G. Wall system to provide accurate positioning of steel within form cavity to conform to reinforcing requirements of ACI 318.
- H. EPS foam panels with concrete to provide min. insulation level of R 22.4 across full line of form unit cavity widths:
- I. EPS foam to provide maximum vapor permeation of 3.5 Perm-in. (200 ng/Pa.s.m2)/25mm

1.7 SUBMITTALS

A. Submit relevant laboratory tests or data that validate product compliance with performance criteria specified prior to commencement of work under this Section.

- B. Submit copy of manufacturer's product installation manual
- C. Submit copy of valid product ICC evaluation report for applicable code jurisdiction of Ref: ICC-ES (ER-6163).
- D. Submit copy of valid product ICC evaluation report to the applicable 2015 building code jurisdiction per construction specifications. Ref: ICC-ES ESR-2092
- E. Submit copy of current Underwriters Laboratories Inc (UL) listing for proposed ICF wall assembly Ref: BXUV.U930
- F. Submit copy of ICF installer qualification per Section 3.01 prior to commencement of work under this Section
- G. Submit copy of Technical Advisor qualification per Section 1.11 prior to commencement of work under this Section
- H. General Contractor to coordinate and submit dimensioned shop/coordination drawings (Plans, elevations and sections) to show all ICF walls, openings, penetrations and structural embeds from associated trades. All associated trades are required to provide information to verify locations of openings, penetrations or structural embeds, etc. which may affect the execution of their scope of work.

1.8 OUALITY ASSURANCE

- A. Contractor shall engage the services of a Trained Installer or Technical Associate for the duration of the work under this Section who has been trained in procedures pertaining to the correct installation of the specified form system.
 - 1. An experienced ICF Contractor (trained installer) with minimum 3 years of experience in supervising at least 3 commercial ICF projects with gross wall areas over 40,000 ft2 (3,761 m2) or;
 - A qualified masonry or traditional concrete forming contractor with minimum 5 years of experience in commercial construction applications. Contractor shall engage the services of a Trained Installer or Technical Associate for the duration of the work under this Section
 - 3. The installing contractor shall have demonstrated experience with supervising at least 3 commercial construction projects of with gross wall areas of 40,000 ft2 (3,761 m2) or greater. (Submit project name(s)/ location(s)).
- B. Prior to commencement of ICF installation and associated work, conduct a meeting at project site with the General Contractor, ICF Installer, ICF Technical Advisor, and trades responsible for installing any associated works interfacing directly with the ICF wall assembly to ensure coordination across all trades
- C. Trained Installer /Technical Associate shall furnish proof of training documentation to Contractor prior to commencement of work under this Section.
- D. The ICF manufacturer to assign a Technical Advisor, usually a staff member who has received instructional training in the installation of the ICF system forms (as administered by the ICF manufacturer used for the project) and is in the capacity of providing periodic technical oversight of the installation on site for at least 2 projects similar to the proposed project in size, scope, and complexity.
- E. The completed ICF surface shall be plane and plumb, with no deviation greater than 1/4 inch in any planar direction when tested with a 10 foot straightedge or shall not exceed the concrete forming tolerances specified in ACI 117, whichever is more applicable. For wall sections with one sided ICF or one side of exposed concrete finish, provide Class B finish per ACI 347.

- Note: For wall sections requiring concrete finish surface, no plastic webs, furring's or metal ties should visible at finish surface.
- F. Variation of Linear Building Line: For position shown in plan and related portion of ICF walls, and partitions, do not exceed 1/2 inch in 20 feet (12 mm in 6,), nor 3/4 inch in 40 feet (19 mm in 12m) or more.
- G. Variation in Cross-Sectional Dimensions: For thickness of ICF walls, from dimensions shown, do not exceed minus 1/4 inch (6 mm) plus 1/4 inch (6 mm).
- H. Site Mock-up: Construct sample wall mock-up panel to include full wall system and details, located where directed by Architect. Refer to drawings for extent of mockup required.
- I. Trained Installer/Technical Associate to meet with Contractor prior to material delivery on site to co-ordinate provision of access, storage area, and protection of ICF product and spatial requirements for form alignment placement steel storage & forming.

1.9 DELIVERY STORAGE & HANDLING

- A. Deliver products in original factory packaging, bearing identification of product, manufacturer and batch/lot number.
- B. Trained Installer shall furnish product packaging labels to contractor as required to maintain traceability of product for duration of contract.
- C. Handle and store products in location to prevent damaging and soiling.
- D. Ensure that UV protection is provided for material, should on-site storage extend beyond 30 days.

1.10 PROJECT CONDITIONS

A. Use appropriate measures for protection and supplementary heating when required to ensure proper curing conditions in accordance with manufacturer's recommendations if installation is carried out during periods of weather where temperatures are below minimum specified by governing Building Code for concrete and masonry.

1.11 WARRANTY

A. Manufacturer's Standard Warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: NUDURA Corporation; www.nudura.com.
- B. Fox Blocks; www.foxblocks.com.
- C. Logix; www.logixicf.com.

2.2 MATERIALS

A. Insulated Concrete Form units to be supplied through an authorized distributor.

2.3 CONCRETE

- A. Concrete supplied under Section 03 30 00 shall be of strength as specified.
- B. Minimum 4,000 psi at a target 6" +/- 1" target slump, at discharge w/ max ³/₄" aggregate size and 0.50 W/C ratio.

2.4 REINFORCING STEEL

A. Reinforcing steel shall be as specified in Section 03 20 00 and shall be supplied under that Section for placement by the Trained Installer.

2.5 WALL ALIGNMENT SYSTEM

A. The Trained Installer shall furnish and utilize the OHSA compliant Form Alignment System (provided as an installation component of the ICF wall system) to facilitate construction of the wall assembly, and to provide adjustment for ensuring plumbness of the wall during construction.

2.6 WATERPROOFING

A. Waterproofing material shall be EPS foam compatible.

2.7 PARGING

A. Where called for on drawings, parging (stucco type) shall be Prep Coat B 2000 as supplied by NUDURA Corporation or approved equal.

2.8 SEALANTS

A. Sealants shall be EPS foam compatible such as latex.

2.9 WINDOW OR DOOR OPENING BUCK

A. Engineered wood buck framing system per Section 06 17 00 - Engineered Framing Systems.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect all areas included in Scope of Work to establish extent of work and verify site access conditions.

3.2 PATCHING

A. When installing conduit, pipe, or any other work in ICF walls, compatible spray foam insulation will be used to patch the EPS foam to maintain the full integrity of the insulating value of the wall after the work is complete.

3.3 PRIMER

A. Waterproofing and air barrier primer shall be EPS foam compatible.

3.4 SITE VERIFICATION OF CONDITIONS

- A. Verify that site conditions are as set out in Part 1- General Conditions.
- B. Examine footings installed under Section 03 30 00 are within +/-1/4"(6mm) of level and that steps footing increments are 18" (457 mm) in height. Where partial or half course is intended for starting course elevation, ensure step footing increment is equal to cut form unit less 1/2" (13mm).
- C. If specified, ensure reinforcing steel dowels are in place at specified centers along footing lengths.

3.5 PREPARATION

A. Clean all debris from top of footings prior to commencing work.

3.6 INSTALLATION

- A. Installation of forms to be in strict accordance with manufacturer's product installation manual as supplied in evidence to contractor under Sub Section 1.10 of this Section.
- B. The trained installer shall ensure manufacturer's procedures for the following work are employed on site (as outlined in the manufacturer's product Installation manual):
 - 1. First Course Placement
 - 2. Horizontal Reinforcement Placement
 - 3. Successive Course Placement
 - 4. Door & Window Opening Construction
 - 5. Form Alignment & Scaffolding Installation
 - 6. Vertical Reinforcement Placement
 - 7. Pre-Concrete Placement Inspection
 - 8. Concrete Placement
 - 9. Access & Form Alignment Assembly Removal

3.7 SERVICE PENETRATIONS

- A. Service penetrations (e.g.- electrical service conduits, water service pipes, air supply and exhaust ducts etc.) shall be installed at the required locations as indicated by the appropriate trade
- B. Service penetrations exceeding 16" x 16" (400mm x 400mm) in area shall be reinforced.
- C. Prior to concrete placement, install service penetration sleeves (supplied by others) at designated locations to create voids where services can be passed through at later date.
- D. All new work shall not be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete. When installing conduit, pipe, or any other work in ICF walls, compatible spray foam insulation will be used to patch the EPS foam to maintain the full integrity of the insulating value of the wall after the work is complete. Patching shall match adjacent surfaces and shall be to the satisfaction of the Architect and Engineer. Necessary ICF accessories such as tape, mesh, sealants, and primers shall be EPS foam compatible.

3.8 CLEANUP

A. Clean up and properly dispose of all debris remaining on job site related to the installation of the insulated concrete forms.

3.9 PROTECTION

- A. Provide temporary coverage of installation to reduce exposure to Ultra Violet light should final finish application be delayed longer than 60 days.
- B. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction materials.

3.10 FIELD QUALITY CONTROL

A. General contractor and ICF installation company shall develop and implement an Installation Quality Control Plan (QCP) based on the ICF manufacturer's recommended means and methods. The quality control plan (QCP) shall provide an outline for monitoring the Pre-Installation and Post-Installation process to ensure the work is performed in accordance with the drawings and specifications. The quality control plan shall include the pre-pour inspection check list to inspect erected formwork, reinforcement placement, door and window opening construction/locations, steel embed placement, and alignment and bracing systems. The quality control plan shall also include the post pour inspection check list. The ICF installation company shall ensure that the cast-in-place concrete walls are consolidated correctly and are level, plumb, square, and straight with all dimensions conforming to the drawings and within required tolerances. Notify the designer of record in writing of defective formwork within 7 working days of the date of ICF inspection. Include the fully initialed and signed pre-pour and post pour checklists as part of the appropriate QC Daily Reports.

END OF SECTION

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.2 REFERENCE STANDARDS

- A. ACI 301 Specifications for Structural Concrete; 2010 (Errata 2012).
- B. ACI 318 Building Code Requirements for Structural Concrete and Commentary; 2011.
- C. ACI SP-66 ACI Detailing Manual; 2004.
- D. ASTM A184/A184M Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement; 2006 (Reapproved 2011).
- E. ASTM A615/A615M Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- F. ASTM A1064/A1064M Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- G. CRSI (DA4) Manual of Standard Practice; 2009.
- H. CRSI (P1) Placing Reinforcing Bars; 2011.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices; also provide coordination drawings with HVAC electrical work, penetrations and pathways.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
 - 1. Provide documentation of recycled content type and percentage, steel mill process, location and extraction/recovery of primary raw materials, location of mill, location of fabrication and costs.

1.4 OUALITY ASSURANCE

- A. Perform work of this section in accordance with CRSI (DA4), CRSI (P1), ACI 301, ACI SP-66, ACI 318, and ASTM A 184/A 184M.
 - 1. Maintain one copy of each document on project site.
- B. Provide Architect with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.
- C. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- B. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
 - 1. Form: Flat Sheets.
 - 2. Mesh Size and Wire Gage: As indicated on drawings.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 - 3. Supports and Spacers in contact with the ground:
 - a. Precast concrete supports with a surface area of not less than 4 square inches, a compressive strength equal to greater than the specified compressive strength of the concrete being placed, and embedded tie wires for securing the reinforcing.
 - b. Chairs with plastic components for placement within 1 1/2 inches of weathering surfaces.
 - c. Spacers: Plastic.
 - 4. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.2 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
 - 1. Review locations of splices with Architect.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Conform to structural drawings for concrete cover over reinforcement.

3.2 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01 40 00, will inspect installed reinforcement for conformance to contract documents before concrete placement.
- B. Inspection Services shall conform to the statement of special inspections noted in the structural drawings.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete for composite floor construction.
- B. Floors and slabs on grade.
- C. Concrete foundation walls and building walls.
- D. Footings.
- E. Column and Piers.
- F. Joint devices associated with concrete work.
- G. Miscellaneous concrete elements, including equipment pads.

1.2 RELATED REQUIREMENTS

- A. Section 03 10 00 Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 11 19 Insulating Concrete Forming.
- C. Section 03 20 00 Concrete Reinforcing.
- D. Section 03 35 13 High Tolerance Concrete Floor Finishing.
- E. Section 07 92 00 Joint Sealants: Products and installation for sealants for saw cut joints and isolation joints in slabs.
- F. Section 03 39 00 Concrete Curing.
- G. Section 07 95 13 Expansion Joint Cover Assemblies.
- H. Section 09 21 16 For Gypsum Board Assemblies.

1.3 REFERENCE STANDARDS

- A. ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- B. ACI 211.2 Standard Practice for Selecting Proportions for Structural Lightweight Concrete; 1998 (Reapproved 2004).
- C. ACI 301 Specifications for Structural Concrete; 2010 (Errata 2012).
- D. ACI 302.1R Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
- E. ACI 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
- F. ACI 305R Hot Weather Concreting; 2010.
- G. ACI 306R Cold Weather Concreting; 2010.
- H. ACI 318 Building Code Requirements for Structural Concrete and Commentary; 2011.
- I. ASTM C33/C33M Standard Specification for Concrete Aggregates; 2013.
- J. ASTM C94/C94M Standard Specification for Ready-Mixed Concrete; 2015.
- K. ASTM C109/C109M Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2013.
- L. ASTM C150/C150M Standard Specification for Portland Cement; 2015.
- M. ASTM C173/C173M Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2014.

- N. ASTM C260/C260M Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.
- O. ASTM C330/C330M Standard Specification for Lightweight Aggregates for Structural Concrete; 2014.
- P. ASTM C494/C494M Standard Specification for Chemical Admixtures for Concrete; 2013.
- Q. ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.
- R. ASTM C881/C881M Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2014.
- S. ASTM C1107/C1107M Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014.
- T. ASTM C1240 Standard Specification for Silica Fume Used in Cementitious Mixtures; 2014.
- U. ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).
- V. ASTM E329 Standard Specification for Agencies engaged in the testing and/or inspections of Material used in Construction.
- W. IBC 2015 International Building Code.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Samples: Submit samples of underslab vapor retarder to be used.
- D. LEED Submittal: If any ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used; use LEED New Product Content Form.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
 - 1. Provide documentation of location of plant, location of material quarries and costs.
- F. LEED Submittal: Provide documentation of VOC content in g/L for adhesives and sealants applied within the building waterproofing envelope.
- G. Design Mixtures:
 - 1. Submit for each concrete mixture.
 - 2. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 3. Indicate amounts of mixing water to be withheld for later addition at Project site.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.

- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. Concrete Producer: Engage a firm with experience in producing concrete silimar to that indicated for this project and within 15 percent of this project size, with a record of successful in service performance as well as sufficient production capacity to supply concrete without delaying the work.
 - 1. Provide documentation that concrete producer has supplied concrete for at least 3 projects within 15 percent of project size and complexity in the last six years.
- E. Concrete Contractor: Engage a firm with experience in placing and finishing concrete similar to that indicated for this project and within 15 percent of this project size, with a record of successful in service performance.
 - 1. Provide documentation that the concrete contractor has installed concrete for at least 3 projects within 15 percent of project size and complexity in the last six years.
- F. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1.
 - 2. Personnel performing laboratory tests shall be an ACI-certified Concret 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.

PART 2 PRODUCTS

2.1 FORMWORK

A. Comply with requirements of Section 03 10 00.

2.2 REINFORCEMENT

A. Comply with requirements of Section 03 20 00.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I Normal Portland type.
 - 1. Acquire all cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C 33.
 - 1. Acquire all aggregates for entire project from same source.
 - 2. Regional Content: Extracted/recovered and processed within 500 mile radius of project site.
- C. Lightweight Aggregate: ASTM C330/C330M.
 - 1. Regional Content: Extracted/recovered and processed within 500 mile radius of project site.
- D. Fly Ash: ASTM C618, Class F.
- E. Ground Granulated Blast-Furnace Slag (GGFB): ASTM C 989, Grade 100 or 120.
- F. Calcined Pozzolan: ASTM C618, Class N.
- G. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- H. Water: Clean and not detrimental to concrete.

2.4 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- G. Accelerating Admixture: ASTM C494/C494M Type C.
- H. Retarding Admixture: ASTM C494/C494M Type B.
- I. Water Reducing Admixture: ASTM C494/C494M Type A.

2.5 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: Product complying with ASTM E 1745, Class A.
 - 1. Maximum Permeance ASTM E96: 0.018 perms (English).
 - 2. Provide standard accessories and tape for complete system.
 - 3. Acceptable Products:
 - a. Stego Wrap (15-mil) Vapor Barrier by STEGO INDUSTRIES LLC.
 - b. Perminator 15 mils by W.R. Meadows, Inc.
 - c. 15 Mil Green by Reef Industries, Inc.
 - d. Vapor Block 15 by Raven Industries.
 - e. Yellow Guard 15-mil Vapor Barrier by Poly-America.
 - 4. Single ply polyethylene is prohibited.
- B. Non-Shrink Cementitious Grout: ASTM C1107; Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
 - 2. Minimum Compressive Strength at 28 Days: 7,000 psi.
- C. Curing Materials: Comply with requirements of Section 03 39 00.

2.6 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System:
 - 1. Complying with ASTM C881/C881M and of Type required for specific application.
- B. Waterproofing Admixture Slurry: Slurry coat of Portland cement, sand, and crystalline waterproofing additive, mixed with water in proportions recommended by manufacturer to achieve waterproofing at cold joints in concrete.
 - 1. Products:
 - a. Aquafin, Inc: www.aquafin.net.
 - b. Xypex Chemical Corporation: www.xypex.com.
 - c. Kryton International Inc.; www.kryton.com.
- C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
 - 1. Material: ASTM D1751, cellulose fiber.
- D. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.

- 1. Available Products:
 - a. Volclay Waterstop-RX; Colloid Environmental Technologies Co.
 - b. Conseal CS-231: Concrete Sealants Inc.
 - c. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
 - d. Hydrotite; Greenstreak.
 - e. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
 - f. Adeka Ultra Seal; Mitsubishi International Corporation.
 - g. Superstop; Progress Unlimited Inc.
- E. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1 inch diameter holes for conduit or rebars to pass through at 6 inches on center; ribbed steel stakes for setting.
 - 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
 - 2. Height: To suit slab thickness.

2.7 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
 - 1. Replace no less than 30% and no more than 40% of Portland cement in structural concrete with approved pozzolanic materials.
 - 2. Do not exceed 25% total pozzolans in finished slabs.
 - 3. GGBS Content: not to exceed 35% of total cementitious material by weight.
 - 4. Silica Fume Content: not to exceed 10% of total cementitious material by weight.
 - 5. Obtain approval in advance before submitting mix containing any other pozzolanic substances.
- B. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.
 - 1. Replace no less than 30% and no more than 40% of Portland cement in structural concrete with approved pozzolanic materials.
 - 2. Do not exceed 25% total pozzolans in finished slabs.
 - 3. GGBS Content: not to exceed 35% of total cementitious material by weight.
 - 4. Silica Fume Content: not to exceed 10% of total cementitious material by weight.
 - 5. Obtain approval in advance before submitting mix containing any other pozzolanic substances.
- C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- D. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- E. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
 - 2. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
 - 3. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
 - 4. Cement Content: Minimum 470 lb per cubic yard.
 - 5. Water-Cement Ratio: Maximum 58 percent by weight interior and maximum 40 percent by weight exterior.
 - a. Interior slabs shall have a maximum water-cementitious material ration of 50 percent by weight.

- 6. Do not air entrain concrete to trowel-finished interior floors and suspended slabs; do not allow entrapped air content to exceed 3 percent.
- 7. Entrained air content for footings shall not exceed 4.5 percent, determined in accordance with ASTM C173.
- 8. Air Content (Exterior exposed concrete only): Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
 - a. Total Air Content: 6 percent, determined in accordance with ASTM C173/C173M.
- 9. Maximum Slump: 4 inches.
- 10. Maximum Aggregate Size: 3/4 inch.

2.8 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Do not add water to concrete during delivery, at the project site or during placement except as predetermined by concrete mix, unless approved by the Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

- A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
- B. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.
- C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels using an epoxy adhesive approved by th Architect.
- D. Install vapor retarder under interior slabs on grade in accordance with manufacturer's instructions and ASTM E 1643.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- D. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.4 SLAB JOINTING

A. Locate joints as indicated on the drawings.

- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Separate slabs on grade from vertical surfaces with joint filler.
- E. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- F. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07 90 05 for finish joint sealer requirements.
- G. Install joint devices in accordance with manufacturer's instructions.
- H. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- I. Install joint device anchors for expansion joint assemblies specified in Section 07 95 13. Maintain correct position to allow joint cover to be flush with floor and wall finish.
- J. Apply sealants in joint devices in accordance with Section 07 90 05.
- K. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- L. Place concrete continuously between predetermined expansion, control, and construction joints.
- M. Do not interrupt successive placement; do not permit cold joints to occur.
- N. Place floor slabs in checkerboard or saw cut pattern indicated.
- O. Saw cut joints as soon as the concrete is firm enough not to be damaged by the cutting action. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.

3.5 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. 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.

3.6 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of Section 03 35 13.

3.7 CURING AND PROTECTION

A. Comply with requirements of Section 03 39 00.

3.8 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.3 and Table 1705.3 of the 2015

IBC and the statement of special inspections noted in the structural drawings. The exceptions noted in Section 1705.3 shall not be allowed.

- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Provide free access to concrete operations at project site and cooperate with appointed firm; inspection to occur for:
 - 1. Steel reinforcement placement.
 - 2. Steel reinforcement welding.
 - 3. Anchor bolts and studs.
 - 4. Verification of use of required design mixture.
 - 5. Concrete placement, including conveying and depositing.
 - 6. Curing procedures and maintenance of curing temperature.
 - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- E. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- F. Test composite samples of fresh concrete obtained according to ASTM C172.
- G. Compressive Strength Tests: ASTM C 39/C 39M.
 - 1. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure five 6" x 12" standard cylinder specimens for each composite sample fifth cylinder will be held in reserve.
 - 2. Test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - 3. Obtain test samples for every 75 cu yd or less of each class of concrete placed.
 - 4. A compressive-strength test shall be the average compressive strength from all specimens obtained from same composite sample and tested at age indicated.
 - 5. 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.
- H. Take one additional 6" x 12" test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- I. Perform one slump test, at point of discharge for each set of test cylinders taken, following procedures of ASTM C 143/C 143M.
- J. Perform air content test for each set of test cylinders taken, following procedures of ASTM C231.
- K. Test Concrete temperature each hour when air temperature is 40 degrees F and below and when 80 degrees F and above for each set of test cylinders taken, following procedures of ASTM C1064.

3.9 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

- 1. Testing and inspecting agency will make additional tests of concrete when test results indicate that slump, compressive strengths, or other requirements have not been met, as directed by Architect.
- 2. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
- 3. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 4. Testing and inspecting agency will make additional tests of concrete when test results indicate that slump, compressive strengths, or other requirements have not been met, as directed by Architect.
- B. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.
- C. Defective Concrete: Concrete that is not conforming to required lines, details, dimensions, tolerances or specified requirements shall be repaired or replaced, subject to the approval of the Architect

END OF SECTION

SECTION 03 35 00

DECORATIVE CONCRETE ENGRAVING AND FINISHING SYSTEM

PART I - GENERAL

1.1. SECTION DESCRIPTION:

A This section includes decorative concrete floor finishes; preparation, staining, sealing, engraving and coating systems for interior and exterior locations.

1.2. SECTION INCLUDES

- A Cleaner, degreaser, neutralizer and stripper
- B Specialty engraving tools and equipment
- C Templates, edging and associated equipment
- D Acid based- and water-based stains and color extender
- E Exterior acrylic sealer
- F Low VOC exterior acrylic sealer

1.3. RELATED SECTIONS

- A Section 01 23 00 ALTERNATE BIDS
- B Section 01 30 00 ADMINISTRATIVE REQUIREMENTS
- C Section 01 81 15 SUSTAINABLE DESIGN REQUIREMENTS
- D Section 03 10 00 CONCRETE FORMING AND ACCESSORIES
- E Section 03 30 00 CAST-IN-PLACE CONCRETE
- F Section 03 39 00 CONCRETE CURING

1.4. REFERENCES

- A ASTM D-2369 10: Standard Test Method for Volatile Content of Coatings
- B ASTM D-3960 05: Standard Practice for Determining Volatile Organic Compound
- C (VOC) Content of Paints and Related Coatings
- D ASTM D-2794: Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation
- E ASTM D-638: Standard Test Method for Tensile Properties of Plastics
- F ASTM D-695: Standard Test Method for Compressive Properties of Rigid Plastics

G ASTM D-790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

1.5. SUBMITTALS

- A Product Data: Manufacturer's Technical Data Sheets and Material Safety Data sheets for each product to be used, including:
 - 1 Cleaner, degreaser and stripper
 - 2 Surface etcher
 - 3 Water- based and acid-based stain
 - 4 Neutralizer
 - 5 Acrylic sealer
 - 6 Exterior acrylic and low-VOC acrylic sealer
- B Maintenance and cleaning instructions
- C Product Data: Manufacturer's Technical Data Sheets and Material Safety Data sheets for each product to be used, including:
 - 1 Cleaner, degreaser and stripper
 - 2 Surface etcher
 - 3 Water- based and acid-based stain
 - 4 Neutralizer
 - 5 Acrylic sealer
 - 6 Exterior acrylic and low-VOC acrylic sealer
 - 7 Maintenance and cleaning instructions
- D Selection Samples: For each concrete stain or pigment specified, two sets of color samples representing the manufacturer's full range of available colors.
- E Installer's Qualifications
 - 1 References: List of successfully completed projects, including project name, location, type and area quantity (square feet) of concrete stain and finish system installed.
- F List of areas indicating which areas are to receive concrete stain and finish.
- G Scaled Illustration(s) of each design for each area to be engraved into surface of concrete slab.
- H On Site Mock-Up: Provide a mock-up for evaluation of stain color, finish and workmanship under field conditions. Mock-up shall be minimum 2' x 2' in area for

each specified color. Mock-up shall be applied to the surface of a concrete slab built from batch concrete used in the primary slab, and finished and cured in manner substantially similar to the primary slab. Do not proceed with concrete stain and finish until workmanship, color, and sheen of mock-up are approved by Architect.

1.6. LEED CREDIT CATEGORIES

- A Product Data for Materials and Resources Credit 5 (MRc5) Contractor shall provide the following documentation to the LEED project consultant:
 - 1 Documentation substantiating the geographic source of concrete finish material extraction is located within a 500 mile radius of the project site.
 - 2 Documentation substantiating the geographic source of concrete finish manufacture is located within a 500 mile radius of the project site.

1.7. QUALITY ASSURANCE

- A Installer shall have demonstrated success in application of similar decorative concrete floor finish systems in past projects. Installer shall employ persons trained in proper application of concrete floor finish systems.
- B In providing the installation, the installer warrants that the work will be performed in a good and workmanlike manner and that installed materials will be new and of good quality.

1.8. DELIVERY, STORAGE, AND HANDLING

- A All preparation, stain, and finish materials should be protected from weather, sun, and heat and stored in a cool, dry area.
- B Store acid-based stain products away from combustible material and sources of heat.
- C Keep flammable materials away from ignition sources.
- D Store preparation, stain and finish materials in manufacturer's unopened packaging until ready for installation.
- E Protect materials during handling and application to prevent damage or contamination.
- F Tightly close container lids immediately during and after use.
- G Dispose of solvent-based materials in accordance with requirements of local authorities having jurisdiction.

H Do not transfer products to unmarked containers. Do not reuse empty containers, which may contain hazardous product residues.

1.9. PROJECT CONDITIONS

- A Protect concrete surfaces to receive decorative concrete finish from adhesives, tar, paint, plaster or other construction materials that adversely impact slab preparation procedures.
- B Observe and maintain temperature, humidity, and ventilation conditions recommended by manufacturer for each product during installation.
- C Install concrete finish system to concrete surfaces that have sufficiently cured.

 Measure slab moisture and pH levels in accordance with manufacturer recommendations. Proceed with installation after slab is determined to be ready to receive finish.
- D Restrict access to areas of work by other trades during preparation, staining, sealing and coating installation.
- E Control airborne dust and other particulate debris during sealing and coating installation.
- F Restrict access to areas of work by other trades until after concrete finish is cured or dried.

1.10. SEQUENCING

- A Pre-installation Meeting: Conduct a meeting of the concrete finish installer, Prime Contractor and Project Architect before the start of application of concrete floor finish system.
 - 1 Review area access control methods, dust and debris control methods and sequencing with other trades.
 - 2 Review concrete preparation, stain, sealing, and coating methods.
 - 3 Walk through site to identify areas of special treatment or preparation needs.
 - 4 Evaluate on-site mock-up for conformance with contract documents.
- B Install concrete floor finish system at appropriate time within overall project sequence to maximize satisfactory installation quality and minimize detrimental conditions or damage.

PART 2 - PRODUCTS

2.1. Acceptable Manufacturers:

A Engrave-A-Crete, Inc. 403 Oak Avenue, Mansfield, MO 65704. Tel: (800) 884-2114. Web: www.engraveacrete.com

2.2. Degreaser

- A multipurpose, high-strength industrial cleaner and degreaser. Used during the initial cleaning process to remove grease, grime, oily films and to suspend particles in order to ensure a clean surface.
- B Water-soluble, corrosive solution containing sodium hydroxide.

2.3. Neutralizer

- A A concentrated pH balancing solution to be used following the application of CR-765 Surface Prep & Etch and after the application of RAC stain. Increases the pH level of the concrete surface to ensure stain and sealer performance.
 - 1 Water-soluble, corrosive solution containing ammonium hydroxide and other proprietary neutralizing agents.

2.4. Paint and Sealer Remover

- A A liquid surface treatment that breaks the chemical bond of paint, sealers, glues and adhesives over concrete.
- B Partially-soluble solution containing N-Methyl-2-Pyrrolidone.

2.5. Surface Prep and Etch

- A liquid surface treatment used to prepare concrete surfaces before applying stains and sealers. Removes topical laitance and creates a porous surface to increase the penetration of concrete stains and sealers. Produces minimal fumes, is biodegradable and safe for use near grass and plants.
- B Water soluble, corrosive solution containing phosphoric acid and other proprietary additives.

2.6. Reactive Acid Chemical Stain:

A A single-component solution of acidic metallic ion particles that chemically react with the free alkali particles in the cement to form oxides that become a permanent part of the concrete substrate.

2.7. Non-Skid Additive: "Fine" grade, "Coarse" grade and "Aggressive" grade aluminum oxide grit to be broadcast during final application of clear acrylic or epoxy coatings to improve skid resistance of decorative concrete finishes.

2.8. Outside Acrylic/ 400 VOC

- B A clear, solvent-based, 25% solids acrylic coating designed for exterior decorative concrete finishes. Outside Acrylic has excellent gloss, stain-resistance, is easy to clean and non-yellowing. (For Exterior Use Only, VOC compliant in all US state jurisdictions except California)
- C Solvent-soluble acrylic polymer containing acetone, p-chlorobenzotri fluoride and aromatic petroleum distillates.

PART 3 – EXECUTION

3.1. EXAMINATION

- A Conduct pre-installation meeting in accordance with specifications Part 1, section I and walk through site to identify areas of special treatment or preparation needs.
- B Determine that new concrete has adequately cured through measurement of pH and moisture levels at various points of the installation.
- C Confirm that concrete surface is clean, dry, structurally sound, and free from dust, particulates, oils, paint, bituminous materials, curing and sealing compounds, adhesives, and other contaminants.
- Do not begin installation until substrates have been properly prepared and are ready to receive decorative concrete finish.

3.2. PREPARATION

- A Follow Technical Data Sheet surface preparation instructions for the stain/material being used.
- B Protect existing wall surfaces, trim and other fixtures using securely fastened polyethylene sheets during decorative concrete finish process. Do not apply tape directly to the concrete.
- C Ensure that access restrictions and coordination with other trades are managed to provide a secure, clean work environment.

C Observe safety precautions as recommended by manufacturer, OSHA, and other regulating jurisdictions addressing: ventilation rates, respiratory protection, eye protection, ear protection, clothing and skin protection, and jobsite notification.

3.3. CONCRETE ENGRAVING

- A Coordinate concrete engraving sequence and methods with the design requirements of the project.
- B Lay out design on prepared slab in conformance with the design illustration approved during the Submittals procedure of these specifications:
- C Set up engraving tools to ensure proper depth of cut, sight alignment, jig attachment and wheel configuration, as appropriate for design elements. Install center pivot or linear rail mounts at appropriate locations on slab and secure using masonry screws.
 - 1 Adhere to quality control tolerances during engraving:
 - a Depth of engravement shall be consistent across the entire surface of the concrete: 3/16" below surface.
 - b Straight lines shall not deviate more than +/- 1/8" per 10 linear feet.
 - c Curved elements shall follow an even curvature, without visually discernable deviations.
 - d Clean and remove debris and grit from work area as the installation progresses.
 - e Upon completion of engraving operations, proceed with clean-up and supplemental sealing and/or coating applications.

END OF SECTION 03550

SECTION 03 35 13 - CONCRETE FLOOR FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finishing slabs on grade and monolithic floor slabs.
- B. Surface treatment with concrete hardener and sealer.

1.2 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. LEED Submittal: Provide documentation of VOC content in g/L for primers, sealers and floor coatings applied within the building waterproofing envelope.
- C. Submit floor surface flatness and levelness measurements to determine compliance with specified tolerances.
- D. Maintenance Data: Provide data on maintenance renewal of applied coatings.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
 - 1. Maintain one copy on project site.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 PROJECT CONDITIONS

A. Coordinate the work with concrete floor placement and concrete floor curing.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperature of 50 degrees F minimum.
- B. Provide ventilation sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Concrete Floor Finishes:
 - 1. Dayton Superior Corporation: www.daytonsuperior.com.
 - 2. L&M Construction Chemicals, Inc: www.lmcc.com.
 - 3. BASF Construction Chemicals-Building Systems: www.chemrex.com.

2.2 COMPOUNDS - HARDENERS AND SEALERS

- A. Chemical Hardener: Clear, chemically reactive, waterborne solution of inorganic siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. Provide for interior slabs not receiving a subsequent finish (remaining exposed concrete); regardless of the Finish Schedule indicating concrete hardener or not.
 - 2. VOC Content: Not to exceed 200 g/L.
 - 3. Acceptable Products:
 - a. Ashford Formula, Concrete Chemical Company, Inc.

- b. Seal Hard, L & M Construction Chemicals, Inc.
- c. Titan Hard, Burke Construction Chemicals.

PART 3 EXECUTION

3.1 FLOOR FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1R.
- B. Steel trowel surfaces that will receive carpeting, resilient flooring, seamless flooring, thin set terrazzo, or thin set ceramic tile.
- C. Steel trowel surfaces that are scheduled to be exposed.

3.2 FLOOR SURFACE TREATMENT

A. Apply hardener to floor surfaces in accordance with manufacturer's instructions.

3.3 TOLERANCES

- A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for flatness.
- B. Measure for F(F) and F(L) tolerances for floors in accordance with ASTM E1155, within 48 hours after slab installation.
- C. Finish concrete to achieve the following tolerances:
 - 1. Exposed to View and Foot Traffic: Ff 20 and Fl 15.
 - 2. Slabs to be Covered with Thin Floor Coverings (ie., resilient flooring): Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17.
 - 3. Slabs to be Covered with Wood Athletic Flooring: Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17.
 - 4. Slabs to be Covered with Carpet and Other Slabs: Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 20; with minimum values of flatness, F(F) 17; and of levelness, F(L) 15.
 - 5. The F(L) values listed above are not applicable to elevated slab on deck. Only F(F) values apply to elevated slabs.
- D. Correct the slab surface if tolerances are less than specified.
- 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.

END OF SECTION

SECTION 03 39 00 - CONCRETE CURING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces.

1.2 SUBMITTALS

A. Product Data: Provide data on curing compounds, moisture-retaining sheet, and polyethylene film, including compatibility of different products and limitations.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1R.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Membrane Curing Compound: ASTM C309 Type 1 Clear or translucent, Class B.
- C. Moisture-Retaining Sheet: ASTM C171.
 - 1. Curing paper, regular.
 - 2. Polyethylene film, clear, minimum nominal thickness of 0.0040 in..
 - 3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd, 40 inches wide.
- D. Polyethylene Film: ASTM D2103, 4 mil thick, clear.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to be cured.

3.2 EXECUTION - HORIZONTAL SURFACES

- A. Cure floor surfaces in accordance with ACI 308R.
- B. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306 for cold-weather protection and ACI 305 for hot-weather protection during curing.
- C. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq.ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Cure floor surfaces in accordance with ACI 308.
- E. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges; maintain in place for not less than 4 days.
- F. Absorptive Moisture-Retaining Sheet: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.
- G. Membrane Curing Compound: Apply curing compound in accordance with manufacturer's instructions in one coat.

3.3 EXECUTION - VERTICAL SURFACES

- A. Cure surfaces in accordance with ACI 308R.
- B. Cure surfaces in accordance with ACI 308.
- C. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in one coat.

3.4 PROTECTION

A. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 04 20 00 - UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete Block.
- B. Clay Facing Brick.
- C. Outdoor Slate Chalkboard.
- D. Mortar and Grout.
- E. Reinforcement and Anchorage.
- F. Flashings.
- G. Lintels.
- H. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

- A. ACI 530/530.1/ERTA Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.
- B. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A615/A615M Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- D. ASTM A1064/A1064M Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- E. ASTM C67 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2014.
- F. ASTM C90 Standard Specification for Loadbearing Concrete Masonry Units; 2014.
- G. ASTM C140/C140M Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2014.
- H. ASTM C144 Standard Specification for Aggregate for Masonry Mortar; 2011.
- I. ASTM C150/C150M Standard Specification for Portland Cement; 2015.
- J. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- K. ASTM C270 Standard Specification for Mortar for Unit Masonry; 2014a.
- L. ASTM C404 Standard Specification for Aggregates for Masonry Grout; 2011.
- M. ASTM C476 Standard Specification for Grout for Masonry; 2010.
- N. ASTM C780 Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2012.
- O. ASTM C979/C979M Standard Specification for Pigments for Integrally Colored Concrete; 2010.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples for Verification: For each type and color of the following:
 - 1. Face brick, in the form of straps of five or more bricks.
 - 2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Shop Drawings:
 - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls. Fabricated
 - 2. Flashing: Detail inside/outside corner units, sill and head conditions; end-dam conditions; base-of-wall, lintel and low roof-to-wall conditions; and other special applications.
- F. Mix Designs: For each type of mortar and grout.
 - 1. Include description of type and proportions of ingredients.
 - 2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- G. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00; report recycled content for masonry units and reinforcement.
 - 1. Credit MR 5.1 and 5.2:
 - a. Provide product data indicating location of manufacturer and location of extraction/recovery of primary raw materials.
 - b. Include statement indicating cost for each regionally manufactured material.
 - 2. Credit MR 4.1 and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - a. Contributions to this Credit include recycled content of bottom ash and recycled content of steel reinforcement.
- H. LEED Submittals:
 - 1. Credit EQ 4.1: Product Data highlighting VOC content of cavity wall insulation adhesive.
- I. Coordinate with Construction Waste Management requirements.
- J. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.
- K. Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with hot-weather requirements.
- L. Temporary Bracing Plan:
 - 1. Provide a temporary bracing plan for the information-only of the Architect; plan to be submitted minimum two weeks prior to initiating masonry Work.
 - 2. The bracing plan must be based on the Mason Contractors Association of America's Standard Practice for Bracing Masonry Walls Under Construction, and Masonry Wall Bracing Design Handbook, or another industry recognized standard.

- 3. Bracing plan must be reviewed by a Professional Structural Engineer licensed in the State of Maryland; Professional Structural Engineer to provide a letter certifying his review of the plan and acknowledgement of its completeness.
- 4. The bracing plan and Professional Structural Engineer's letter must indicate project conditions unique to any referenced standard and provide for the unique bracing required for those conditions.
- 5. Maintain one copy of any industry standard referenced within the plan, on project site.

1.5 QUALITY ASSURANCE

- A. Masonry Contractor Qualification:
 - 1. Engage a trade contractor with at least 10 years experience in masonry construction of type and scope included in the construction documents.
 - 2. Demotrate experience by submitting to the Owner a list of at least 10 masonry projects of similar size, complexity and scope.
 - 3. Submit resumes of all key personnel that will be assigned to the Project; dedicate assigned personnel to the Project for the entire scope of Work.
- B. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
 - 1. Maintain one copy of each document on project site.
- C. Fire-Resistance Ratings: Where indicated, provide materials identical to those assemblies with fire-resistance ratings conforming to the Standard Method for Determining Fire Resistance of Concrete and Masonry Assemblies, ACI 216.1-97/TMS-0216-07, National Concrete Masonry Association TEK 7-1A, and ASTM E-119, and acceptable to authorities having jurisdiction.
 - 1. Certification of concrete masonry units for fire ratings must be provided by the National Concrete Masonry Association or qualified independent testing agency.
 - 2. Provide Letter of Certification for aggregates used in mix design assuring compliance with ASTM C 33 and ASTM C 331.
 - 3. Provide mix design and determined equivalent thickness, for units incorporating recycled content materials.

1.6 MOCK-UP

- A. Mock-up: Prior to installing unit masonry, construct sample wall panels to verify selections made under sample submittals and to demonstrate aesthetic effects as well as other qualities of materials and execution. Build mockups to comply with the following requirements, using materials for final unit of Work.
 - 1. Locate mockup on site within 4 weeks of Contract award in location as directed.
 - 2. List of Material Used in Construction Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to specifically identify exact materials used. Include mix proportions for mortar and grout and source of aggregates.
 - 3. Build mockup of typical wall as detailed on the drawings.
 - a. Include exterior face brick.
 - b. Include window complying with requirements of Division 8 Section "Aluminum Windows" with applicable window lintel detail.
 - c. Seal perimeter of window complying with requirements of Division 7 Section "Joint Sealers."
 - d. Include sealant-filled control joints complying with requirements of Division 7 Section "Joint Sealers."

- e. Include weather barriers as specified in Division 7.
- f. Include insulated concrete forms as specified in Division 3.
- 4. Notify the Architect when mock-up is ready for inspection. Remove and replace defective and deficient parts of the wall as identified by the Architect, and replace until such time that all the work is acceptable to the Architect and Owner.
- 5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. Acceptance of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - b. Acceptance of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
 - c. When directed, demolish and remove mockups from Project site.

1.7 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

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

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
 - 3. Verify masonry protection at end of each day; inadequate protection by the trade contractor to be corrected or replaced by the Contractor, for proper protection; costs incurred by the Contractor is not the Owner's responsibility, but may be recovered under agreement with trade contractor.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
 - 2. Special Shapes:
 - a. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - b. Provide bullnose units for outside corners, unless otherwise indicated.
 - c. Bullnose units are not to be used at areas scheduled to be covered with tile.
 - 3. Load-Bearing Units: ASTM C90, normal weight.
 - 4. Recycled Content: Provide units having a minimum fly ash content of 10 percent.
 - a. Provide testing and chain-of-custody certification recycled materials.
 - b. Properly modify the equivalent thickness of fire-rated concrete masonry units, as may be necessary due to the selection and percentage of recycled content materials.
 - 5. Regional Material: Provide concrete block manufactured and of raw materials extracted and/or recovered within 500 miles of project site.

2.2 BRICK UNITS

A. Manufacturers:

- 1. Option 1:
 - a. Brick Color 1: Carolina Ceramics; Heritage Velour.
 - b. Brick Color 2: Taylor, #319 Pearl Gray, Wirecut.
 - c. Brick Color 3: Yankee Hill Tile and Brick; Charcoal Velour Modular.
 - d. Brick Color 4: Yankee Hill Tile and Brick; Charcoal Smooth Modular.
- 2. Option 2:
 - a. Brick Color 1: Glen-Gery Brick; Tuscan Series Burnt Orange Flashed, Velour, Modular.
 - b. Brick Color 2: L&L Supply; Cool Spring Grey, Modular.
 - c. Brick Color 3: Belden; Sierra Blend Velour A.
 - d. Brick Color 4: L&L Supply; Dark Grey W77, Tuscan Series, Modular.
- B. Facing Brick: ASTM C 216, Type FBS, Grade SW.
 - 1. Size: Modular.
 - 2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
 - 3. Regional Material: Provide brick manufactured and of raw materials extracted and/or recovered within 500 miles of project site.

2.3 OUTDOOR SLATE CHALKBOARD

- A. Quarry: Buckinham Slate; www.bvslate.com.
- B. Size: 24 inches by 24 inches.
- C. Thickness: 3/4 inch.
- D Finish: Honed

- E. Fasteners: Type 304 Stainless Steel, split-tail fasteners.
 - 1. Model 10FH, 1 1/4 inches wide by 1/8 inch thick; as manufactuered by The Weston Company. www.westoncompany.com.

2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- B. Packaged blend of portland cement complying with ASTM C 150, Type II/I or Type III, and hydrated lime.
 - 1. Not more than 0.60 percent alkali.
 - 2. Hydrated Lime: ASTM C207, Type S.
 - 3. Mortar Aggregate: ASTM C144.
 - 4. Grout Aggregate: ASTM C404.
- C. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979.
 - 1. Manufacturers:
 - a. Davis Colors: www.daviscolors.com.
 - b. Lambert Corporation: www.lambertusa.com.
 - c. Solomon Colors; _____ : www.solomoncolors.com.
 - d. ESSROC Cement Corp.; Flamingo.
 - e. Lehigh Cement Company.
- D. Admixtures: Permitted for cold- and hot-weather masonry work as permitted by referenced standards; non-chloride types.
- E. Water: Clean and potable.
- F. Integral Liquid Polymeric Water-repellent Mortar Admixture:
 - 1. Include liquid polymeric admixture to the mortar for exterior decorative block walls at the time of mixing.
 - 2. Warranty: Integral liquid polymeric water-repellent mortar admixture shall be warranted by admixture manufacturer to be free of defects and to meet manufacturer's published physical and chemical properties.
 - 3. Installer shall warrant that only mortar containing integral liquid polymeric water-repellent mortar admixture has been used to set decorative block in exterior walls.
 - 4. Description:
 - a. Integral liquid polymeric admixture, added to mortar during mixing, capable of attaining Class E Rating under ASTM E514.
 - b. When tested in walls containing CMUs with compatible integral liquid polymeric water-repellent CMU admixture, walls shall exhibit no decrease in flexural strength or compressive strength of prisms when compared to "control", under ASTM E72.
 - c. Project Standard: Dry-Block Integral Liquid Polymeric Water-repellent Mortar Admixture as manufactured by Grace Construction Products.

2.5 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers of Joint Reinforcement and Anchors:
 - 1. AA Wire Products Co.
 - 2. Dur-O-Wal: www.dur-o-wal.com.
 - 3. Heckman Building Products, Inc.
 - 4. Hohmann & Barnard, Inc (including Dur-O-Wal brand): www.h-b.com.

- 5. WIRE-BOND: www.wirebond.com.
- 6. National Wire Products Industries.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 40,000 psi, deformed billet bars; galvanized.
- C. Joint Reinforcement General:
 - 1. Provide in lengths of not less than 10 feet.
 - 2. Provide with prefabricated corner and tee units of same design type, wire thickness and finish as adjoining joint reinforcement.
- D. Single Wythe Joint Reinforcement: Truss Type at walls without vertical reinforcement, Ladder Type at walls with vertical reinforcement; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 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.
- E. Adjustable Multiple Wythe Joint Reinforcement: Ladder type with adjustable ties or tabs spaced at 16 in on center and fabricated with moisture drip; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1875 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. Vertical adjustment: Not less than 2 inches.
- F. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.
- G. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
 - 1. Steel frame: 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.
- H. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in.
 - 1. Fabricate so that eye is located 3 inches from face of masonry.
- I. Masonry Veneer Anchors: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal study, and as follows:
 - 1. Anchor plates: Designed for fastening to structural backup through sheathing by two fasteners.
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch
 - b. Fabricate sheet metal anchor sections and other sheet metal parts from minimum 14 gage, steel sheet, galvanized after fabrication.
 - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 3-1/2 inches.
 - 4. Products:

- a. Hohmann & Barnard, Inc.; BL-407 Anchor.
- b. Construction Tie Products; CTP Veneer Anchoring System.
- 5. Organic-Polymer-Coated, Steel Drill Screws:
 - a. Dril-Flex; Elco Industries, Inc.
 - b. Traxx; ITW-Buildex.
- J. 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. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 3-1/2 inches.
 - 4. Products:
 - a. Basis of Design Masonry-Veneer Anchors: X-Seal Anchor by Hohmann and Barnard, Inc.; provided with self sealing sheets on face of insulation to provide infiltration seal at anchor locations.
 - b. Organic-Polymer-Coated, Steel Drill Screws:
 - 1) Dril-Flex; Elco Industries, Inc.
 - 2) Traxx; ITW-Buildex.
- K. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by ½ inch thick by 24 inches long, with ends turned up 2 inches unless otherwise indicated.
 - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
- L. Reinforcing Bar Positioners:
 - 1. Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells, or as indicated on Drawings. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated. Provide units at all reinforced walls.
 - 2. Products:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.
- M. Reinforcing Bar Couplers:
 - 1. Mechanical splice connectors capable of developing intension or compression at least 125 percent of the specified yield strength of the bar.
 - 2. Representative Product: BarSplice Products, Inc., Tapered Threaded Grip-Twist Series.

2.6 FLASHINGS

- A. Flexible Flashing CMU Backup: For flashing not exposed to the exterior, use the following, unless otherwise indicated:
 - 1. A full, single sheet of 5 ounce copper sheet bonded with a rubber base adhesive, between two layers of fiberglass fabric weighing not less than 0.3 ounces per square foot per layer with a minimum of 10 x 20 threads per inch.
 - 2. Performance Requirements:
 - a. Tensile Strength: ASTM E8; 32,000 psi.
 - b. Elongation: ASTM D412 die C; 50 percent.

- c. Puncture Resistance: ASTM E154; minimum 390 pound.
- d. Tear Resistance-Initial: ASTM D1004; minimum 43.8 pound.
- e. Tear Resistance-Propagation: ASTM D1938; minimum 22.2 pound.
- f. Permeance: ASTM E96-B; 0.00 perms.
- g. Water Absorption: ASTM D570; Pass.
- 3. Accessories: Flashing mastic composed of asphalt, mineral stabilizers and interfiber, manufactured to a trowel grade consistency, double-sided EPDM tape, or choice of polyurethane or silicone caulks.
- 4. Available Products:
 - a. Multi-Flash 500, Manufactured by York Manufacturing, Inc.; red color-coded.
 - b. Copper Sealtight 2000 by Advanced Building Products, Inc.
 - c. Copper-Tuff by Hohmann & Barnard, Inc.
- B. Flexible Flashing Stud Wall Backup: For flashing not exposed to the exterior, use the following, unless otherwise indicated:
 - 1. Surface Adhered Flashing System:
 - a. Basis-of-Design: Hyload Cloaked Flashing System by Hyload.
 - 2. Surface Adhered Membrane with Rubberized Adhesive:
 - a. Surface adhered membrane to be a composite 40 mil membrane consisting of 25 mils of elastomeric/thermal plastic membrane incorporating DuPont Elvaloy and 15 mils of SBS asphaltic adhesive; 1-1/2 inch sealant compatible drip edge and silicone release sheet added.
 - b. Reinforce with synthetic fibers, calendered into sheet form, rolled and cut to standard widths.
 - 3. Performance Requirements:
 - a. Elongation: ASTM D412; 225 percent.
 - b. Tensile Strength: ASTM D412; 875 psi.
 - c. Tear Strength: ASTM D624; 270 psi.
 - d. Low Temperature Flexibility: ASTM D146; -25 degrees F Pass.
 - e. Water Absorption: ASTM D471; less than 0.1 percent.
 - f. Color as selected by Architect from manufacturer's range of black, grey, buff or white.
 - g. Compatible with urethane and silicone sealant.
 - h. UV stable.
 - 4. Pre-Formed Three-Dimensional Shapes:
 - a. System cloaks are pre-formed, three-dimensional flexible units used to detail corners, level changes, stop ends, and special applications.
 - b. Standard type cloaks and special designs to be fabricated as required by the design.
 - 5. Related Materials:
 - a. Two-sided, self-adhering tape used must seal the top of cloaks against the back-up wythe; system adhesive to be used as an alternative.
 - b. Mastic must be used to seal laps, joints, and top terminations.
- C. Flexible Flashing at Stud Wall Backup Contractor Option: Contractor may select to use the Flex-Flash Flashing System with #T1 Termination Bar by Hohmann & Barnard, Inc., at the Contractor's discretion, instead of the Hyload System without additional cost to the Owner.
 - 1. Sheet Material: 40 mil membrane with DuPont Elvaloy Kee; pressure sensitive clear adhesive for full bond to backup construction.
 - 2. Provide system with preformed corners and end dams fabricated by Hohmann & Barnard, Inc.; Elvaloy Kee or stainless steel material.

- 3. Termination bar to be predrilled; fastening provided directly at steel framing locations.
- 4. Conforms to ASTM D412, ASTM D2240, ASTM D624 Die C, and ASTM G154.

D. Stainless Steel Drip Plates:

- 1. Provide at flexible flashing locations, as indicated.
- 2. Material: Minimum 26 gage stainless steel.
- 3. Profile:
 - a. Provide with closed hemmed drip edge to extend past face of wall.
 - b. Provide vertical leg extending up backup wall minimum 2 inches.
 - c. Provide pitch in drip plate as indicated on Drawings.
 - d. Provide shop fabricated inside and outside corner.
 - e. At lip brick profiles, match profile with step in drip plate.
- 4. Flexible flashing will cover drip plate; cut flush with face of mortar joint.
- 5. Provide 1/8 inch thick sealant tape between drip plate and steel structural member.
- 6. Bond flexible flashing to drip plate as recommended by flexible flashing manufacturer; product selection to ensure against adhesive drool beyond face of brick.
- 7. Backer rod and sealant to be provided under drip edge per Division 7, at locations protecting steel.
- E. Drip Plate Fasteners CMU Backup: Use low-velocity powder actuated ballistic point fastener with pre-mounted washer; submit ICC-ES Evaluation Report under product data submittals indicating fastener selection appropriate for intended use.
- F. Drip Plate Fasteners Stud Backup: Corrosion-resistant screws located at every stud line.
- G. Self-adhering Flashing Seam Tape:
 - 1. Sheet Material: 40 mil membrane with DuPont Elvaloy Kee; pressure sensitive clear adhesive for full bond to stainless steel drip plate and backup construction.
 - 2. Conforms to ASTM D412, ASTM D2240, ASTM D624 Die C, and ASTM G154.
 - 3. Basis-of-Design Product: Flex-Flash 8-inch wide roll by Hohmann & Barnard, Inc.

2.7 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of air space, and designed to prevent mortar droppings from clogging cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Mortar Net Solutions; Mortar Net with Insect Barrier: www.mortarnet.com.
 - 2) Keene Building Products; Product Keenestone Cut 2".
 - 3) Hohmann and Barnard, Inc.; Product Mortar Trap.
- C. Cavity Vents: Polyester mesh or cellular insect-resistant vents.
 - 1. Locations: Flashing location at base of cavity wall construction.
 - 2. Manufacturers:
 - a. CavClear/Archovations, Inc: www.cavclear.com.
 - b. Dur-O-Wal; Product D1006 Cell Vents: www.dur-o-wal.com.
 - c. Hohmann & Barnard, Inc; Quadro-Vent: www.h-b.com.
 - d. Mortar Net Solutions; Mortar Net Weep Vents: www.mortarnet.com.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials, as recommended by brick manufacturer.

2.8 LINTELS

- A. Concrete Lintels: Precast units made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars required to support loads indicated. Cure precast lintels by same method used for concrete masonry units.
- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as required and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.9 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C270, using the Property Specification.
 - 1. Masonry below grade and in contact with earth: Type M.
 - 2. Exterior, loadbearing masonry: Type S.
 - 3. Exterior, brick veneer: Type N.
 - 4. Interior, loadbearing masonry: Type N, except reinforced masonry to be Type S.
 - 5. Interior, non-loadbearing masonry: Type O or Type N (Contractor's discretion).
- 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.

PART 3 EXECUTION

3.1 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.

3.2 PREPARATION

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

3.3 COLD AND HOT WEATHER REQUIREMENTS

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

3.4 INSTALLATION - GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.

- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Do not install cracked, broken or chipped masonry units for any location to be exposed in completed work; do not install cracked, broken or chipped masonry units exceeding ASTM allowances in work to remain concealed or within mechanical or electrical spaces.
- E. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - Mix units from several pallets or cubes as they are placed.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - Install compressible filler in joint between top of partition and underside of structure above.
 - At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 46.

COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Concrete Masonry Units:
 - 1. Bond: Running.
 - Coursing: One unit and one mortar joint to equal 8 inches.
 - 3 Mortar Joints: Concave.
- E. Brick Units:
 - Bond: Running. 1.
 - 2. Mortar Joints: Concave.

PLACING AND BONDING 3.6

- A. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Interlock intersections and external corners.

- D. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- F. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, cavity insulation vapor barrier adhesive is applied, or bitumen dampproofing is applied.

G. Pointing:

- 1. During the tooling of joints, enlarge voids and holes, and completely fill with mortar.
- 2. Point joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance.
- 3. Prepare joints for sealant application, where indicated.
- H. Isolate masonry partitions from vertical structural framing members with a control joint and flexible anchors.
- I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.7 CAVITY VENTS

- A. Place cavity vents such as two consecutive vertical joints will include vent followed by a vertical joint without; repeat this placement for full length of application.
- B. Install vents in contact with flashing, full-width of head joint and uninterrupted by mortar.

3.8 CAVITY MORTAR CONTROL

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

3.9 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
 - a. Reinforcement of this subparagraph 3 is in addition to continuous reinforcement.
- 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. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

- 1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated.
- 2. Keep open space free of mortar and other rigid materials.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Typical: Place masonry joint reinforcement in first and second horizontal joints above and below openings.
 - 1. Extend minimum 16 inches each side of opening.
 - 2. Modify placement where flashing occurs in joint; flashing takes precedent; joint reinforcement location adjusted as accepted by Architect.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. 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.
- F. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 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.
- G. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width of openings and at least 4 inches into adjacent masonry at each end; turn up not less than 2 inches to form end dams.
 - 2. Carry flashing across air space behind veneer and up face of backup construction at least 8 inches to form watertight pan; extend flashing into masonry backup minimum 1-3/4 inches; secure flashing at non-masonry construction with termination bar and seal.
 - 3. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 4. Embed flashings in mortar joint; place flashing on sloping bed of fresh mortar and cover with fresh mortar
 - 5. Seal lapped seams of stainless steel drip plates with self-adhering flashing seam tape; stop self-adhering flashing seam tape 3/8 inch of brick face and extend over turned up edge 3 inches onto backup construction; center tape on overlapping edge.
 - 6. Seal lapped ends and penetrations of flashing with adhesive or sealant, as recommended by flashing manufacturer, before covering with mortar.
- B. Lap end joints of flashings at least 6 inches and seal watertight as recommended by flashing manufacturer.
- C. Cut flashing flush with face of mortar joint after masonry construction is complete and inspected.

3.12 LINTELS

A. Install loose steel lintels over openings.

B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled

3.13 GROUTED COMPONENTS

- A. Lap splices minimum 48 bar diameters.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- C. Place and consolidate grout fill without displacing reinforcing.
- D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.14 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 48 inches.

3.15 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.

3.16 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- E. Do not build into masonry construction organic materials that are subject to deterioration.

3.17 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/8 inch, plus 1/8 inch.

3.18 CUTTING AND FITTING

A. Cut and fit for chases, pipes, and conduit. Coordinate with other sections of work to provide correct size, shape, and location.

3.19 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.4 or IBC 2015, Level B Quality Assurance Program of TMS 402/ACI 530/ASCE 5 and TMS 602/ACI 530.1/ASCE 6 and the Statement of Special Inspections noted in the structural drawings.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67 requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.
 - 1. Test three samples for each 5,000 square feet of wall or portion thereof; test one sample at 7 days and two at 28 days for each set.

3.20 REPAIRING WORK

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units; install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

3.21 CLEANING

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

3.22 PROTECTION

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

END OF SECTION

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members, support members and struts.
- B. Base plates, shear stud connectors and expansion joint plates.
- C. Grouting under base plates.

1.2 REFERENCE STANDARDS

- A. AISC (MAN) Steel Construction Manual; 2011.
- B. AISC S303 Code of Standard Practice for Steel Buildings and Bridges; 2010.
- C. AISC S348 Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.
- D. ASTM A36/A36M Standard Specification for Carbon Structural Steel; 2014.
- E. ASTM A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- F. ASTM A108 Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.
- G. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- H. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- J. ASTM A325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- K. ASTM A325M Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.
- L. ASTM A490 Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.
- M. ASTM A490M Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric); 2014a.
- N. ASTM A500/A500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- O. ASTM A501/A501M Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- P. ASTM A563 Standard Specification for Carbon and Alloy Steel Nuts; 2007a (Reapproved 2014).
- Q. ASTM A563M Standard Specification for Carbon and Alloy Steel Nuts [Metric]; 2007.
- R. ASTM A992/A992M Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).
- S. ASTM C1107/C1107M Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014.
- T. ASTM F436 Standard Specification for Hardened Steel Washers; 2011.

- U. ASTM F959 Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners; 2013.
- V. ASTM F1554 Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2007a.
- W. AWS A2.4 Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- X. AWS D1.1/D1.1M Structural Welding Code Steel; 2015.
- Y. RCSC (HSBOLT) Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2009.
- Z. IBC 2015 International Building Code.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
 - 2 Connections
 - 3. Indicate cambers and loads.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
 - 5. For structural-steel connections indicated to comply with design loads, connections and structural analysis data shall be signed and sealed by the qualified Professional Engineer registered in the State of Maryland responsible for their preparation.
- C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- D. Mill Test Reports: Signed by manufacturer certifying that the product complies with specified requirements. Indicate structural strength, destructive test analysis and non-destructive test analysis.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
 - 1. Provide documentation of recycled content type and percentage, location of extraction/recovery of primary raw materials, steel mill process, location of mill, location of fabrication and costs.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.4 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."
- B. Comply with Section 10 of AISC "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.
- C. Maintain one copy of each document on site.
- D. Fabricator: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and within 15 percent this project size, with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.
 - 1. Fabricator must be designated as an AISC-certified plant, Category STD.

- 2. Contractor Option: Comply with the following procedures instead of engaging an AISC-Certified Plant:
 - a. Demonstrate that the fabricator has in place a quality control program for meeting IBC requirements and compliance with AISC recommendations and standards.
 - b. At no additional cost to the Owner, provide for an independent field inspection of fabrications and welding to comply with IBC, AISC and AWS recommendations and standards.
 - c. Provide certified shop inspection reports signed by the fabricator and an independent inspection agency indicating that the steel, as fabricated, complies with requirements of Contract Documents.
 - d. Provide shop drawings signed and sealed by a qualified licensed Structural Engineer, within the project jurisdiction, responsible for design of connections.
 - e. The steel fabricator shall provide signed and sealed field modification details with backup computations for all field revisions.
 - f. Field modifications details and computations must be prepared by same licensed Structural Engineer preparing shop drawings.
- 3. Provide documentation that fabricator has provided material for and erected at least 3 projects within 15 percent of project size and complexity, in the last 6 years.
- E. Erector: AISC-Certified Steel Erection company specializing in performing the work of this Section with minimum 5 years of documented experience.
 - 1. Provide documentation that the erector has erected at least 3 projects within 15 percent of project size and complexity in the last six years.
- F. Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Maryland.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off the ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
 - 2. Do not store materials on structure in a manner that might cause deterioration, damage, or overload to members or supporting structures repair or replace damaged materials or structures as directed.

1.6 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- D. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.
- E. Pipe: ASTM A53/A53M, Grade B, Finish black.

- F. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars.
- G. Sag Rods: ASTM A 36/A 36M.
- H. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A galvanized to ASTM A 153/A 153M, Class C.
- I. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 or A325M, Type 1, medium carbon, galvanized, with matching compatible ASTM A563 or A563M nuts and ASTM F436 washers.
- J. High-Strength Structural Bolts: ASTM A490 or A490M; Type 1 alloy steel, with matching compatible ASTM A563 or A563M nuts and ASTM F436 washers.
- K. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or A563M nuts and ASTM F436 Type 1 washers.
- L. Headed Anchor Rods: ASTM A 307, Grade C.
- M. Load Indicator Washers: Provide washers complying with ASTM F959 at all connections requiring high-strength bolts.
- N. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- O. Grout: Non-shrink, non-metallic aggregate type, complying with 1 and capable of developing a minimum compressive strength of 7,000 psi at 28 days.
- P. Shop and Touch-Up Primer: Type specified in Division 9 painting sections, complying with VOC limitations of authorities having jurisdiction.
- Q. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Develop required camber for members.
- C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements of AWS D1.1.
- D. Bolt Holes: Drill or punch standard bolt holes perpendicular to metal surfaces.
- E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

2.3 FINISH

- A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
- B. Galvanize structural steel members to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating.
 - 1. Galvanize shelf angles, lintels and hung plates located in exterior walls.
 - 2. Galvanize all exterior steel.
- C. Surface preparation: SSPC-SP2: "Hand Tool Cleaning", or SSPC-SP3, "Power Tool Cleaning".
- D. Provide a dry film thickness of not less than 1.5 mil.
- E. Refer to Division 9 painting sections for primer specifications.

2.4 SOURCE QUALITY CONTROL

- A. An independent testing agency will perform source quality control tests, as specified in Section 01 40 00. Inspection services shall conform to Section 1705.2 of the 25015 IBC Code, the quality assurance inspection requirements of AISC 360 and the Statement of Special Inspections noted in the structural drawings.
- B. High-Strength Bolts: Provide testing and verification of all shop-bolted connections in accordance with AISC "Specification for Structural joints using ASTM A 325 or A 490 Bolts".
 - 1. Pre-tensioned and slip-critical bolts shall be installed using direct-tension-indicator washer method or twist-off type tension control bolt method.
- C. Welded Connections: Visually inspect all shop-welded connections and test all full penetration welds using ultrasonic testing performed in accordance with ASTM E 164.
 - 1. Inspect all joint preparation for complete joint penetration welds and verify compliance with welding procedure specification requirements.

PART 3 EXECUTION

3.1 ERECTION

- A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
- B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components and shear studs indicated on shop drawings.
 - 1. Prepare steel surfaces as recommended by manufacturer of shear studs.
 - 2. Use automatic end welding or headed studs shear connectors according to AWS D1.1 and the manufacturers written instructions.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC "Specification for Structural Joints Using High-Strength Bolts".
- E. Do not field cut or alter structural members without approval of Architect.
- F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
- G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.2 TOLERANCES

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

3.3 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 10 40 00. Inspection services shall conform to Section 1705.2 of the 2015 IBC Code, the quality assurance inspection requirements of AISC 360 and the Statement of Special Inspections noted in the structural drawings.

- B. High-Strength Bolts: Provide testing and verification of all field-bolted connections in accordance with AISC "Specification for Structural Joints using ASTM A 325 or A 490 Bolts".
 - 1. Pre-tensioned and slip-critical bolts shall be installed using direct-tension-indicator washer method or twist-off type tension control bolt method.
- C. Welded Connections: Visually inspect all field-welded connections and test all full penetration welds using ultrasonic testing performed in accordance with ASTM E 164.
 - 1. Inspect all joint preparation for complete joint penetration welds and verify compliance with welding procedure specification requirements.
- D. In addition to visual inspection, filed-welded shear connectors shall be tested and inspected according to the requirements of AWS D1.1 for stud welding.
- E. Correct deficiencies in work that inspections indicate does not comply with the specified requirements.

SECTION 05 12 13 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes architecturally exposed structural-steel framing.
 - 1. Requirements in Division 05 Section "Structural Steel Framing" also apply to AESS framing.

1.2 DEFINITIONS

A. Architecturally Exposed Structural Steel: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS provided items of AESS are specifically identified and requirements below are met for AESS.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections. Indicate orientation of bolt heads.
 - 5. Indicate exposed surfaces and edges and surface preparation being used.
 - 6. Indicate special tolerances and erection requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

1.6 COORDINATION

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

PART 2 PRODUCTS

2.1 STEEL MATERIALS

A. Comply with Section 05 12 00 for all steel materials.

2.2 PRIMER

A. Primer: Comply with Division 09 painting Sections.

2.3 FABRICATION

- A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.
- B. In addition to special care used to handle and fabricate AESS, comply with the following:
 - 1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
 - 2. Grind sheared, punched, and flame-cut edges of AESS to remove burrs and provide smooth surfaces and edges.
 - 3. Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
 - 4. Fabricate AESS with exposed surfaces free of seams to maximum extent possible.
 - 5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
 - 6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
 - 7. Fabricate AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
 - 8. Seal-weld open ends of hollow structural sections with 1/4-inch closure plates for AESS.
- C. Curved Members: Fabricate indicated members to curved shape by rolling to final shape in fabrication shop.
 - 1. Distortion of webs, stems, outstanding flanges, and legs of angles shall not be visible from a distance of 20 feet under any lighting conditions.
- D. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch with a tolerance of 1/32 inch for AESS.
- E. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.4 SHOP CONNECTIONS

- A. Connection Preference: Shop connections shall be welded unless specifically indicated otherwise.
- B. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

- 1. Joint Type: Snug tightened.
- C. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:
 - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
 - 2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
 - 3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
 - 4. Provide continuous welds of uniform size and profile where AESS is welded.
 - 5. Grind butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus 0 inch for AESS.
 - 6. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
 - 7. At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
 - 8. Make fillet welds for AESS oversize and grind to uniform profile with smooth face and transition.

2.5 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces to be high-strength bolted with slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards as required for applied finish:
 - 1. SSPC-SP 11, "Power Tool Cleaning to Bare Metal" or;
 - 2. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

- 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
 - 1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

3.3 ERECTION

- A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
 - 1. Erect AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
- B. Do not use thermal cutting during erection.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
 - 2. Orient bolt heads as indicated on Drawings.
- B. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.
 - 1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
 - 2. Remove erection bolts in AESS, fill holes, and grind smooth.
 - 3. Fill weld access holes in AESS and grind smooth.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Division 05 Section "Structural Steel Framing." The testing agency will not be responsible for enforcing requirements relating to aesthetic effect.
- B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

3.6 REPAIRS AND PROTECTION

- A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning, unless a more stringent finishing method is required for applied finish.

SECTION 05 21 00 - STEEL JOIST FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Open web steel joists, with bridging, attached seats and anchors.
- B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.
- C. Supplementary framing for floor and roof openings greater than 18 inches.
- D. Joist accessories.

1.2 REFERENCE STANDARDS

- A. ASTM A36/A36M Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM E94 Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).
- C. ASTM E164 Standard Practice for Contact Ultrasonic Testing of Weldments; 2013.
- D. ASTM E165/E165M Standard Test Method for Liquid Penetrant Examination for General Industry; 2012.
- E. ASTM E709 Standard Guide for Magnetic Particle Testing; 2014.
- F. AWS B2.1/B2.1M Specification for Welding Procedure and Performance Qualification; 2014.
- G. AWS D1.1/D1.1M Structural Welding Code Steel; 2015.
- H. RCSC (HSBOLT) Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2009.
- I. SJI (SPEC) Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.
- J. SJI Technical Digest No. 9 Handling and Erection of Steel Joists and Joist Girders; 2008.
- K. SSPC-SP 2 Hand Tool Cleaning; 1982 (Ed. 2004).
- L. IBC 2015 International Building Code.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Show layout, designation, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.
 - 1. Indicate locations and details of bearing plates to be embedded in other construction.
 - 2. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer licensed in the State of Maryland who is responsible for its preparation.
- C. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
 - 1. Provide documentation of recycled content type and percentage, location of extraction/recovery of primary raw materials, steel mill process, location of mill, location of fabrication and costs.
- D. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

- E. Manufacturer's Certificates: Signed by manufacturers certifying that joists comply with requirements.
- F. Manufacturer's Mill Certificates: Signed by bolt manufacturers certifying that bolts comply with requirements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacturer joists complying with applicable specifications and load tables or SJI "Specifications".
 - 1. Manufacturer's Responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- B. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Maryland.
- C. Perform Work, including that for headers and other supplementary framing, in accordance with SJI Standard Specifications Load Tables and SJI Technical Digest No.9.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Steel Joists:
- B. Canam Group Inc: www.canam-steeljoists.ws
- C. CMC Joist: www.cmcjoist.com.
- D. Nucor-Vulcraft Group: www.vulcraft.com.

2.2 MATERIALS

- A. Open Web Joists: SJI Type K Joists and Type KCS Joists:
 - 1. Provide bottom and top chord extensions as indicated.
 - 2. End bearing of 2-1/2 inches on steel supports.
 - 3. End bearing of 4 inches on masonry supports.
 - 4. Finish: Shop primed.
- B. Open Web Joists: SJI Type LH Joists:
 - 1. Provide bottom and top chord extensions as indicated.
 - 2. End bearing of 4 inches on steel supports.
 - 3. End bearing of 6 inches on masonry supports.
 - 4. Finish: Shop primed.
- C. High-Strength Bolts, Nuts and Washers: ASTM A 325, Type 1, heavy hex steel bolts with ASTM A563 heavy hex nuts and ASTM F436 washers; plain.
- D. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.
- E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- F. Shop and Touch-Up Primer: Type specified in Section 09 91 23, complying with VOC limitations of authorities having jurisdiction.

2.3 FABRICATION

- A. Manufacture steel joists to meet SJI's "Specifications", with steel angle top and bottom-chord members; of joist type and end and top-chord arrangements as indicated.
- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- C. Provide holes in chord members for connecting and securing other construction to joists.
- D. Camber steel joists according to SJI's "Specifications".
- E. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per twelve inches.
- F. Bridging: Provide bridging anchors and number of rows of horizontal and diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Provide additional erection bridging if required for stability and where indicated on the Drawings.
- G. Fabricate steel bearing plates with integral anchorages of sizes and thicknesses indicated. Shop prime paint.
- H. Supply ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within ½ inch of finished wall surface unless otherwise indicated.
- I. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.4 FINISH

- A. Prepare surfaces to be finished in accordance with SSPC-SP 2.
- B. Apply shop primer to joists and joist accessories to provide a continuous dry paint film not less than 2 mil thick; apply two coats of shop primer if necessary to meet specified dry film thickness.

PART 3 EXECUTION

3.1 ERECTION

- A. Erect joists with correct bearing on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.
- D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- E. Coordinate placement of anchors in concrete and masonry construction for securing bearing plates.
- F. After joist alignment and installation of framing, field weld joist seats to bearing plates.
- G. Position and field weld joist chord extensions and wall attachments as detailed.
- H. Install supplementary framing for roof openings greater than 18 inches.
- I. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.

- J. Do not field cut or alter structural members without approval of joist manufacturer.
- K. After erection, prime welds and damaged shop primer, except surfaces specified not to be primed.

3.2 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.3 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 Quality Requirements. Inspection Services shall conform to section 1705.2 of the 2015 IBC and the Statement of Special Inspections noted in the drawings.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC "Specification for Structural Joints Using High-Strength Bolts", testing at least 10 percent of bolts at each connection.
- C. Welded Connections: Visually inspect all field-welded connections and test 100 percent of full-penetration welds using one of the following:
 - 1. Radiographic testing performed in accordance with ASTM E94.
 - 2. Ultrasonic testing performed in accordance with ASTM E164.
 - 3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
 - 4. Magnetic particle inspection performed in accordance with ASTM E709.
- D. Correct deficiencies in work that inspections indicate are not in compliance with specified requirements.

SECTION 05 31 00 - STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Acoustical roof deck (Type 1).
- B. Roof deck.
- C. Composite floor deck.
- D. Cellular floor deck.
- E. Metal form deck.
- F. Supplementary framing for openings up to and including 12 inches.
- G. Bearing plates and angles.
- H. Stud shear connectors.

1.2 REFERENCE STANDARDS

- A. ASTM A36/A36M Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A108 Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.
- C. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- D. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- E. 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; 2015.
- F. AWS D1.1/D1.1M Structural Welding Code Steel; 2015.
- G. AWS D1.3/D1.3M Structural Welding Code Sheet Steel; 2008.
- H. SDI (DM) Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- I. SSPC-Paint 20 Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.3 PERFORMANCE REQUIREMENTS

- A. Select and design metal deck in accordance with SDI Design Manual.
- B. Calculate to structural working stress design and structural properties specified.
- C. Maximum Vertical Deflection of Floor Deck: 1/360.
- D. Maximum Vertical Deflection of Roof Deck: 1/240.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, accessories, and cellular raceways/outlet box locations.
- C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

- D. Certificates: Certify that products furnished meet or exceed specified requirements.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
 - 1. Provide documentation of recycled content type and percentage, location of extraction/recovery of primary raw materials, steel mill process, location of mill, location of fabrication and costs.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 OUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Canam Steel Corporation: www.canam-steeljoists.ws.
- B. Consolidated Systems, Inc.
- C. Epic Metals Corporation.
- D. Nucor-Vulcraft Group: www.vulcraft.com.
- E. Wheeling Corrugating Co: www.wheelingcorrugating.com.

2.2 STEEL DECK

- A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
 - 1. Calculate to structural working stress design and structural properties specified.
 - 2. Maximum Vertical Deflection of Floor Deck: 1/360 of span.
 - 3. Maximum Vertical Deflection of Roof Deck: 1/240.
 - 4. Maximum Vertical Deflection of Form Deck: 1/360 of span.
- B. Acoustical Roof Deck (Type 1): Non-composite type, steel sheet with plain vertical flute faces perforated with 1/8 inch diameter holes staggered 3/8 inch on center:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS), with G90/Z275 galvanized coating.
 - a. Grade: 33 KSI.
 - 2. Sound absorbing elements and spacers shall be furnished under this section for installation by the roofing contractor.
- C. Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS), with G90/Z275 galvanized coating.
 - a. Grade: 33 KSI.
 - 2. Structural Properties:
 - a. Section modulus: 0.234.

- b. Span Design: Multiple.
- 3. Minimum Base Metal Thickness: 20 gage, 0.0359 inch.
- 4. Nominal Height: 1-1/2 inch.
- 5. Profile: Fluted; SDI WR.
- 6. Formed Sheet Width: 36 inch.
- 7. Side Joints: Lapped, mechanically fastened.
- 8. End Joints: Lapped, welded.
- D. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
 - 1. Ungalvanized Steel Sheet: ASTM A1008/A1008M, Designation SS, Grade 33, Type 1.
 - a. Grade: 50 KSI.
 - 2. Primer: Shop coat over cleaned and phosphatized substrate.
 - 3. Structural Properties:
 - a. Section modulus: 0.341.
 - 4. Span Design: Multiple.
 - 5. Minimum Base Metal Thickness: 20 gage, 0.0359 inch.
 - 6. Nominal Height: 2 inches.
 - 7. Profile: Fluted; SDI WR.
 - 8. Formed Sheet Width: 36 inch.
 - 9. Side Joints: Lapped, welded.
 - 10. End Joints: Lapped, welded.
- E. Cellular Floor Deck: Composite floor deck equipped with bottom flat sheet perforated with 1/8 inch diameter holes staggered 3/8 inch on center.
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 50 ksi, with G90/Z275 galvanized coating.
 - 2. Sound absorbing elements and spacers shall be furnished under this section for installation by the roofing contractor.
- F. Metal Form Deck: Corrugated sheet steel:
 - 1. Ungalvanized Steel Sheet: ASTM A1008/A1008M, Designation SS, Grade 33, Type 1.
 - 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.

2.3 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel.
- B. Stud Shear Connectors: Made from ASTM A 108 Grade 1015 bars.
- C. Welding Materials: AWS D1.1/D1.1M.
- D. Fasteners: Galvanized hardened steel, self tapping.
- E. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.
- F. Shop and Touch-Up Primer: Type specified in Section 09 91 23 Interior Painting, complying with VOC limitations of authorities having jurisdiction.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- H. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.
- I. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

2.4 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.
- B. Cant Strips: Formed sheet steel, 16 gage, 3 1/2 inch minimum thickness, 45 degree slope, 3-1/2 inch nominal width and height, flange for attachment.
- C. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.
- D. Floor Drain Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On concrete and masonry surfaces provide minimum 4 inch bearing.
- C. On steel supports provide minimum 3 inch bearing.
- D. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
 - 1. Welding: Use fusion welds through weld washers.
 - 2. Roof Deck Weld Spacing: Weld edge ribs of panels at each support; space additional welds at 12 inches on center or as indicated on the drawings.
 - 3. Floor Deck Weld Spacing: Weld edge ribs of panel at each support and at 12 inches on center.
- E. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.
- F. At welded male/female side laps weld at 18 inches on center maximum.
- G. Weld deck in accordance with AWS D1.3/D1.3M.
- H. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
- I. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
- J. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- K. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- L. Place metal cant strips in position and fusion weld.
- M. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

- N. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- O. Weld stud shear connectors through steel deck to structural members below.
- P. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.3 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 10 40 00. Inspection services shall conform to Section 1705.2 of the 2015 IBC Code, the quality assurance inspection requirements of AISC 360 and the Statement of Special Inspections noted in the structural drawings.
- B. Inspection to include, but not limited to, deck alignment, support, welds, side lap attachment and touch-up galvanizing.
- C. Testing agency to report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional inspecting, at Contractor's expense, must be performed to determine compliance of corrected work with specified requirements.

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formed steel stud exterior wall framing.
- B. Formed steel joist framing and bridging.
- C. Any other framing identified on the drawings as Cold-Formed Metal Framing.

1.2 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. AISI SG02-1 North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)
- C. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- E. 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; 2015.
- F. 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; 2011c.
- G. AWS D1.1/D1.1M Structural Welding Code Steel; 2015.
- H. SSPC-Paint 20 Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- I. International Building Code.

1.3 DESIGN REQUIRMENTS

- A. Axial and wind load bearing elements shall be designed to the following conditions unless more stringent requirements are imposed by governing code; these requirements take precedent when more stringent than governing code.
 - 1. Live/Snow Loads on Roofs: Per Code.
 - 2. Dead Load Pitched Roof Rafters or Trusses: Total of all permanently installed material including roofing, structural frame, accessories and all equipment that is fixed in position.
 - 3. Wind Loads: Loads specified in pressure study prepared by the licensed Professional Engineer.
 - 4. Gravity loads should be per ASCE 7.
- B. Maximum Allowable Deflection:
 - 1. Backing of Masonry Veneer: 1: 600.
 - 2. Other Systems: 1: 240 of span.
- C. Wall and General System:
 - 1. Design to AISI SG-973 Cold-Formed Steel Design Manual.

- 2. Design to provide for 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.
- 3. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- 4. Design to meet loading and anchorage requirements for window systems and curtainwall system must be based on calculations provided by the respective subcontractors.
- 5. Design cold-formed metal truss framing for exterior soffits to meet applicable wind uplift requirements.
- 6. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as in accordance with IBC code.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud, ceiling joist, roof joist, roof rafter, and roof truss layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
 - 3. Provide calculations for loadings and stresses of specially fabricated framing, stamped by a Professional Structural Engineer licensed in the State of Maryland, who is responsible for its preparation.
 - 4. Provide details, shop drawings and calculations for factory-made framing connectors, stamped by a Professional Structural Engineer licensed in the State of Maryland, who is responsible for its preparation.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
 - 1. Provide documentation of recycled content type and percentage, location of extraction/recovery of primary raw materials, steel mill process, location of mill, location of fabrication and costs.

1.5 OUALITY ASSURANCE

- A. Calculate structural properties of framing members in accordance with requirements of AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
 - 1. Maintain one copy of document on project site.

1.6 PROJECT CONDITIONS

A. Verify that field measurements are as indicated on the drawings.

PART 2 PRODUCTS

2.1 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.

2.2 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. Gage and Depth: As required to meet specified performance levels.
 - 2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
 - 3. Provide components fabricated from ASTM A 1008/A 1008M, Designation SS steel.
- B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
 - 1. Base Metal: Structural Steel (SS), Grade 33/230 minimum.
 - 2. Gage and Depth: As required to meet specified performance levels.
- C. Framing Connectors: Factory-made, formed steel sheet.
 - 1. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 - 2. 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 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.
 - c. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.
 - d. Acceptable Products: VertiClip(r) or DriftClip(tm) manufactured by The Steel Network Inc.
 - 3. 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.

2.3 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.4 FASTENERS

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

2.5 SHOP FABRICATED ASSEMBLIES

- A. Shop fabricate metal framing to the greatest extent possible.
- B. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 EXECUTION

3.1 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C 1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- D. Install load bearing studs full length in one piece. Splicing of studs is not permitted.
- E. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- F. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- G. Install intermediate studs above and below openings to align with wall stud spacing.
- H. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- I. Attach cross studs to studs for attachment of fixtures anchored to walls.
- J. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- K. Touch-up field welds and damaged galvanized surfaces with primer.

3.2 INSTALLATION OF JOISTS AND PURLINS

- A. Install framing components in accordance with manufacturer's instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.
- C. Set floor and ceiling joists parallel and level, with lateral bracing and bridging.
- D. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.
- E. Provide web stiffeners at reaction points.
- F. Touch-up field welds and damaged galvanized surfaces with primer.

3.3 TOLERANCES

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

3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests as specified in Section 01 40 00. Inspections services shall conform to the Statement of Special Inspections noted in the structural drawings.
- B. Inspections:
 - 1. Perform inspections in order to assure strict conformance to the shop drawings at all phases of construction.

- 2. Check members for proper alignment, bearing, completeness of attachments, proper alignment, reinforcement, etc.
- 3. Check attachments for conformance with the shop drawings; all welds shall be touched up as specified.
- 4. Complete general inspection of structure prior to applying loads to those members.
- 5. Inspections where and as required by local codes shall be controlled inspections.

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rough hardware.
- B. Steel ladders.
- C. Loose bearing and leveling plates.
- D. Loose steel lintels.
- E. Shelf angles.
- F. Support angles for elevator door sills.
- G. Steel framing and supports for overhead doors.
- H. Steel framing and supports for countertops.
- I. Steel framing and supports for mechanical and electrical equipment.
- J. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- K. Miscellaneous metal trim.
- L. Metal bollards.
- M. Elevator sump grates.
- N. Miscellaneous storm drainage piping specialties.
- O. Pipe Grid.

1.2 REFERENCE STANDARDS

- A. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum; 2012.
- B. ASTM A36/A36M Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A283/A283M Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- 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.
- F. AWS D1.1/D1.1M Structural Welding Code Steel; 2015.

1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel," AWS D1.2 "Structural Welding Code--Aluminum," and AWS D1.3 "Structural Welding Code--Sheet Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.4 SUBMITTALS

- A. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
 - 1. For installed products indicated to comply with design loads include structural analysis data and shop drawings signed by the qualified professional engineer responsible for their preparation.
- B. Samples representative of materials and finished products as may be requested by Architect.
- C. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.
- E. Qualification data for professional engineer responsible for designing fabrications indicated to comply with specific design loads.
- F. LEED Submittal: Documentation of recycled content and location of manufacture.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Metal Surfaces, General:
 - 1. For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes.
 - 2. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
 - 3. Recycled Content: Provide steel with minimum 30 percent total recycled content, 25 percent shall be post-consumer recycled content.
 - 4. Regional Materials: Provide steel manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.
 - 5. Domestic Origin: Consistent with the Maryland Annotated Code, Article 78A known as the "Buy American Steel" Act of the General Assembly of Maryland, Acts of 1978, provide steel manufactured in the United States of America.
- B. Steel Sections: ASTM A 36/A 36M.
- C. Steel Tubing: Product type (manufacturing method) and as follows:
 - 1. Cold-Formed Steel Tubing: ASTM A 500.

- 2. Hot-Formed Steel Tubing: ASTM A 501.
 - a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.
- D. Plates: ASTM A 283.
- E. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.
 - 1. Galvanized finish for exterior installations and where indicated.
 - 2. Black finish elsewhere, unless otherwise indicated.
- F. Gray-Iron Castings: ASTM A 48, Class 30.
- G. Malleable-Iron Castings: ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010).
- H. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.
- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.2 MATERIALS - ALUMINUM

- A. General:
 - 1. Recycled Content: Give preference to aluminum with the highest recycled content feasible.
 - 2. Regional Materials: Give preference to aluminum manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.
- B. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632 (ASTM B 632M) Pattern 1, alloy 6061-T6.

2.3 PAINT

- A. Shop Primer for Ferrous Metal Interior Locations, Loose Lintels, Plates, etc.: Refer to Division 9 painting specifications.
- B. Shop Finish Exterior Fabrications (Stairs, Ladders, Frames, etc):
 - 1. Prepare galvanized surfaces as required by paint manufacturer.
 - 2. Electrostatic application of epoxy powder primer with 375f minimum 15 minute duration heat cure for maximum corrosion protection.
 - 3. Immediate electrostatic application of TGIC polyester powder color coat while metal temperature is minimum of 300f and heat cure for minimum 10 minutes at 400f.
 - 4. This process provides an average of 8-10 mils total coating thickness.
 - 5. Color to be selected by Architect.
- C. Shop Finish Stair Gate Fabrication:
 - 1. Electrostatic application of epoxy powder primer with 375f minimum 15 minute duration heat cure for maximum corrosion protection.
 - 2. Immediate electrostatic application of TGIC polyester powder color coat while metal temperature is minimum of 300f and heat cure for minimum 10 minutes at 400f.
 - 3. This process provides an average of 8-10 mils total coating thickness.

- 4. Color to be selected by Architect.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.
- E. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.4 FASTENERS

- A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563 (ASTM A 563M), and, where indicated, flat washers.
- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1 (ANSI B18.2.3.8M).
- E. Plain Washers: Round, carbon steel, ANSI B18.22.1 (ANSI B18.22M).
- F. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Material General: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5
 - 2. Material Exposed exterior or in contract with ground: Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 (ASTM F 738M) and ASTM F 594 (ASTM F 836M).
- H. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

2.5 GROUT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Construction Grout; W. R. Bonsal Co.
 - 2. Sure-grip High Performance Grout; Dayton Superior Corp.
 - 3. Euco N-S Grout; Euclid Chemical Co.
 - 4. Crystex: L & M Construction Chemicals. Inc.
 - 5. Masterflow 928 and 713; Master Builders Technologies, Inc.
 - 6. Sealtight 588 Grout; W. R. Meadows, Inc.
 - 7. Sonogrout 14; Sonneborn Building Products--ChemRex, Inc.

2.6 FABRICATION

A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions

- indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 120 deg F.
- D. Shear and punch metals cleanly and accurately; remove burrs.
- E. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- M. Fabricate items with joints tightly fitted and secured.
- N. 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.
- O. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.7 ROUGH HARDWARE

- A. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.8 STEEL LADDERS

- A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated. Comply with requirements of ANSI A14.3.
- B. Siderails: Continuous, steel, 1/2-by-2-1/2-inch flat bars, with eased edges, spaced 18 inches apart.
- C. Bar Rungs: 3/4-inch diameter steel bars, spaced 12 inches o.c.
- D. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet o.c. with welded or bolted steel brackets.
 - 1. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
 - 2. Extend side rails 42 inches above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.
- F. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to the rung by a proprietary process.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Mebac, IKG Borden.
 - b. SLIP-NOT, W. S. Molnar Co.
- G. Galvanize ladders, including brackets and fasteners, in the following locations:
 - 1. Elevator pit.

2.9 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels for equal bearing of 1 inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.
- D. Hot dip galvanize loose steel lintels located in exterior walls.

2.10 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.11 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors; furnish inserts if units must be installed after concrete is placed.
 - a. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.
- C. Galvanize miscellaneous framing and supports in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.12 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
- B. Provide cutouts, fittings, and anchorages as required to coordinate assembly and installation with other Work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.
- C. Galvanize miscellaneous steel trim in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.13 FRAME AND GRATE FOR ELEVATOR SUMP

- A. Basis-of-Design: Model R-4810-C by Neenah Foundry Company.
- B. Frames and grates to be Gray Iron, Class 35.

2.14 MISCELLANEOUS STORM DRAINAGE PIPING SPECIALTIES

- A. Downspout Boots: Provide downspout boots made from cast gray iron in heights indicated with inlets of size and shape to suit downspouts.
 - 1. Outlet: NPS 4 (DN 100) outlet, to discharge into pipe.
 - 2. Cast with ears to attach to building.
 - 3. Size: Inlet size to match downspout and NPS 4 (DN 100) outlet.
 - 4. Finish: Shop-applied bituminous coating.
- B. Downspout Adaptors: Provide downspout adaptors made from cast gray iron casting, for attaching to horizontal-outlet, parapet roof drain and to exterior, sheet metal downspout.
 - 1. Inlet size to match parapet drain outlet.

2.15 PIPE BOLLARDS

- A. Provide Schedule 40 black steel pipe of size and height indicated as detailed on the Drawings.
- B. Permanent Setting:

- 1. Set posts in concrete to a depth of 3'-0"; footing diameter minimum 3 times post diameter.
- 2. Fill posts completely with concrete and dome on top.
- C. Finish: Painted as specified in Division 9 "Exterior Painting."

2.16 PIPE GRID

- A. Provide pipe grid where indicated.
- B. Pipe grid consists of a set of pipe battens installed (in plan) perpendicular to the joists.
- C. Individual pipe battens in each set to be located on 6-foot centers.
- D. Rest end of pipe battens on a shelf angle (3 inches x 2 inches) on sides that have masonry wall and secure in place by means of "U" bolts at ends of all pipes.
- E. Rigidly support pipe grid by means of 1/2 inch threaded rods located on centers that shall not exceed 8 feet.
- F. Assemble entire grid into a unit structure.
- G. Pipe battens that compose the grid consists of 1-1/2 inch, Schedule 40, black pipe with battens spanning from wall to wall.
- H. Connect hangers to the overhead structure; hangers provided at each joist where joist crosses the line of the pipe batten.

2.17 FINISHES - STEEL AND IRON

- A. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with the following requirements:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch (0.76 mm) thick or thicker.
- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6 "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3 "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.

2.18 FINISHES - ALUMINUM

- A. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class I Natural Anodized Finish (unless indicated otherwise): AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.19 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

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
- B. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.3 SETTING LOOSE PLATES

- A. Clean concrete bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
 - 1. Use nonshrink, nonmetallic grout, unless otherwise indicated.

2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a 2.0-mil (0.05-mm) minimum dry film thickness.
- B. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A 780.

SECTION 05 51 00 - METAL STAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stairs with concrete treads.
- B. Structural steel stair framing and supports.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 Cast-in-Place Concrete: Placement of metal anchors in concrete.
- B. Section 04 20 00 Unit Masonry: Placement of metal fabrications in masonry.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M Standard Specification for Carbon Structural Steel; 2014.
- B. AWS D1.1/D1.1M Structural Welding Code Steel; 2015.
- C. SSPC-SP 2 Hand Tool Cleaning; 1982 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 1. Include the design engineer's stamp or seal on each sheet of shop drawings.
- C. Delegated Design Data: As required by authorities having jurisdiction.
- D. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
 - 1. Provide documentation of recycled content type and percentage, location of extraction/recovery of primary raw materials, location of fabrication and costs.
- E. Welders' Certificates.

1.5 OUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State of Maryland, 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.

PART 2 PRODUCTS

2.1 METAL STAIRS - GENERAL

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
 - 1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.

- 2. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
- 3. Dimensions: As indicated on drawings.
- 4. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
- 5. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
- 6. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
 - 1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
 - a. Welded Joints: Continuously welded and ground smooth and flush.
 - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
 - c. Exposed Edges and Corners: Eased to small uniform radius.
 - d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.
- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.2 METAL STAIRS WITH CONCRETE TREADS

- A. Jointing and Finish Quality Level: Architectural, as defined above.
- B. Risers: Closed.
- C. Treads: Metal pan with field-installed concrete fill.
 - 1. Concrete Depth: 1-1/2 inches, minimum.
 - 2. Tread Pan Material: Steel sheet.
 - 3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
 - 4. Concrete Reinforcement: None.
 - 5. Concrete Finish: For resilient floor covering.
- D. Risers: Same material and thickness as tread pans.
 - 1. Nosing Depth: Not more than 1-1/2 inch overhang.
 - 2. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
- E. Stringers: Rolled steel channels.
 - 1. Stringer Depth: 12 inches unless greater is indicated on Drawings.
 - 2. End Closure: Sheet steel of same thickness as risers welded across ends.
- F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.
- G. Finish: Shop- or factory-prime painted.
- H. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.3 MATERIALS

- A. Steel Sections: ASTM A 36/A 36M.
- B. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
 - 1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).

- 2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).
- C. Concrete Fill: Portland cement Type I, 3000 psi 28 day strength, 2 to 3 inch slump.
- D. Concrete Reinforcement: Mesh type as detailed, unfinished.

2.4 SHOP FINISHING

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime Painting: Use specified shop- and touch-up primer.
 - 1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
 - 2. Number of Coats: One.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. When field welding is required, clean and strip primed steel items to bare metal.
- B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.3 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- F. Obtain approval prior to site cutting or creating adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

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

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- Wall mounted handrails.
- B. Stair railings and guardrails.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 04 20 00 Unit Masonry: Placement of anchors in masonry.
- C. Section 09 21 16 Gypsum Board Assemblies: Placement of backing plates in stud wall construction.
- D. Section 09 21 16 Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.3 REFERENCE STANDARDS

- A. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum; 2012.
- B. ASTM A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- C. ASTM A500/A500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- D. ASTM B241/B241M Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2012.
- E. ASTM B429/B429M Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2010.
- F. ASTM B483/B483M Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications; 2013.
- G. ASTM E935 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.
- H. ASTM E985 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- I. SSPC-Paint 15 Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Non-welded field connections in aluminum handrails to be limited to greatest fabricated section lengths; locations accepted by Architect and consistent for multiple locations.
- C. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00
 - 1. Provide documentation of recycled content type and percentage, location of extraction/recovery of primary raw materials, location of fabrication and costs.

1.5 QUALITY ASSURANCE

- A. Mock-up: Build mock-up section of guardrail with attached handrail to demonstrate aesthetic effects and set quality standards for fabrication and erection.
 - 1. Size: 42 inches high x 48 inches wide.

PART 2 PRODUCTS

2.1 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.
- B. Design railing assembly, wall rails, and attachments to resist lateral force of 75 lbs at any point without damage or permanent set. Test in accordance with ASTM E 935.
- C. Allow for expansion and contraction of members and building movement without damage to connections or members.
- D. Dimensions: See drawings for configurations and heights.
 - 1. Infill: Round vertical pickets; size and spacing indicated on drawings.
- E. 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.
 - 1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
 - 2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
 - 3. For anchorage to stud walls, provide backing plates, for bolting anchors.
- F. 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.

2.2 ALUMINUM MATERIALS

- A. Aluminum Pipe: Schedule 40; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.
- B. Aluminum Tube: Minimum wall thickness of 0.127 inch; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.
- C. Welding Fittings: No exposed fasteners; cast aluminum.
 - 1. Provide for shop connections.
- D. Straight Splice Connectors: Concealed spigot; cast aluminum.
 - 1. Provide for shop connections.
- E. Non-Weld Field Connections: Interior connector sleeves; set with epoxy adhesive within rail and provide stainless steel set screws concealed on underside of rail.
 - 1. Provide for connecting longest practicable sections of aluminum handrails with shop welded bends, miters and anodized finish.

2.3 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.4 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. Provide spigots and sleeves to accommodate site assembly and installation.

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.
- 4. Select proper welding method to result in consistent finish with final finish.

E. Aluminum Handrail Field Joints:

- 1. Fabricate sleeves for tight press fit; keep sleeves round.
- 2. Cut handrail ends square and to accurate length to assure smooth, tight joints.

2.5 ALUMINUM FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Perform anodizing following fabrication of longest practicable railing length; fabricating railing sections from pre-anodized material is not acceptable.

PART 3 EXECUTION

3.1 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. Anchor railings securely to structure.
- D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Aluminum Handrail Field Joints:
 - 1. Clean area to be joined thoroughly.
 - 2. Apply epoxy adhesive to inside of pipe.
 - 3. Insert sleeve and fit components together, wipe excessive adhesive.
 - 4. Provide stainless steel set screws concealed on underside of handrail; fill head with epoxy setting adhesive and clean excess.

3.2 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.

SECTION 05 53 20 - STAIR NOSINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Extruded aluminum stair nosings.

1.2 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturers product specifications, installation and maintenance instructions.
- C. Samples for initial selection, in the form of manufacturer's color charts or sections of units showing the full range of colors.
- D. Samples for verification, in the form of sections of units in manufacturer's standard sizes; prepare samples from same material to be used for the Work.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain stair nosings from one source and from a single manufacturer.

1.4 SEQUENCING AND SCHEDULING

A. Coordinate with metal stairs so that nosing sub-bases are available for placing integrally with metal pan stair fill.

PART 2 PRODUCTS

2.1 EXTRUDED ABRASIVE NOSINGS

- A. Provide extruded aluminum units with abrasive filler consisting of aluminum oxide or silicon carbide grits, or a combination of both, in an epoxy-resin binder. Furnish in lengths as required to accurately fit each opening or conditions.
 - 1. Provide ribbed units, with abrasive filler strips projecting 1/16 inch (1.5 mm) above the aluminum extrusion and having the maximum recycled content feasible.
 - a. Primary Color: To be selected.
 - b. Highlight Color: Contrasting; to be selected.
 - 2. Provide two-piece design. Sub-channel to be set with stair pan fill (use plywood filler for tread).
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. American Safety Tread Co., Inc.; TP-311 Ribbed
 - 2. Babcock-Davis.; BSTTB-P3.375E.
 - 3. Balco/Metalines, Inc.; DST-330
- C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with the manufacturer.
- D. Drill for mechanical anchors with countersunk holes located not more than 4 inches (100 mm) from ends and not more than 12 inches (300 mm) o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by the manufacturer.
- E. Set elevation of sub-channel and concrete fill levels to provide flush installation to top of finish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Furnish sub-channel to pre-filled stair pan fabricator and exterior concrete step installer for installation at appropriate time.

3.2 INSTALLATION

- A. Install stair nosings in accordance with manufacturer's instructions.
- B. Install sub-channel with concrete fill.
- C. Install tread insert prior to Substantial Completion and protect from damage until acceptance; set insert in sealant applied to sub-channel and clean any sealant seeping from joint following installation of insert.
- D. Work shall be aligned plumb, level, and, where required, flush with adjacent surfaces and rigidly anchored to the substrate.
- E. Clean exposed surfaces as recommended by the manufacturer.

SECTION 05 72 10

ORNAMENTAL RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Steel and iron ornamental fences and railings.
- B. Related Sections include the following:
 - 1. 03 30 00 "Cast in Place Concrete"

1.3 DEFINITIONS

A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas, pedestrian guidance and support, enclosure of spaces, visual separation, or wall protection.

1.4 PERFORMANCE REQUIREMENTS

- A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 - 1. Steel: 72 percent of minimum yield strength.
- B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails:
 - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Top Rails of Guards:

- a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied horizontally and concurrently with 100 lbf/ ft. (1.46 kN/m) applied vertically downward.
- b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
- c. Uniform and concentrated loads need not be assumed to act concurrently.

3. Infill of Guards:

- a. Concentrated load of [00 lbf (0.89 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
- b. Uniform load of 25 lbf/sq. ft. (1.2 kN/sq. m) applied horizontally.
- c. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Manufacturer's product lines of railings assembled from standard components.
 - 2. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes.
- D. Samples for Verification: For each type of exposed finish required.
 - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 - 2. Fittings and brackets.

- 3. Welded connections.
- 4. Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.
- E. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- F. Welding certificates.
- G. Qualification Data: For professional engineer.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according ASTM E 894 and ASTM E 935.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including structural analysis, preconstruction testing, field testing, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.2, "Structural Welding Code--Aluminum."
 - 3. AWS D1.6, "Structural Welding Code--Stainless Steel."
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockups as shown on Drawings.

2. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches (600 mm) in length.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 - 2. Provide allowance for trimming and fitting at site.

1.8 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Steel and Iron Ornamental Railings:
 - a. Architectural Iron Designs, Inc.
 - b. Artezzi.
 - c. Blum, Julius & Co., Inc.
 - d. Braun, J. G., Company; a division of the Wagner Companies.
 - e. Indital USA.
 - f. Lawler Foundry Corporation.
 - g. Livers Bronze Co.

- h. Olin Wrought Iron.
- i. Regency Railings.
- j. TT Triebenbacher Bavarian Iron Works Co.
- k. Wagner, R & B, Inc.; a division of the Wagner Companies.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails, unless otherwise indicated.
 - 1. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.

2.3 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).
- B. Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Castings: Either gray or malleable iron, unless otherwise indicated.
 - 1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
 - 2. Malleable Iron: ASTM A 47/A 47M.

2.4 FASTENERS

- A. General: Provide the following:
 - 1. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work, unless otherwise indicated.
 - 1. Provide tamper-resistant flat-head machine screws for exposed fasteners, unless otherwise indicated.

D. Anchors: Provide cast-in-place or torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 9 Section "High-Performance Coatings."
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
 - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
 - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
 - b. Carboline Company; Carbozine 621.
 - c. ICI Devoe Coatings; Catha-Coat 313.
 - d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
 - e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
 - f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
 - g. Tnemec Company, Inc.; Tneme-Zinc 90-97.
- E. Shop Primer for Galvanized Steel: Zinc-dust, zinc-oxide primer formulated for priming zinc-coated steel and for compatibility with finish paint systems indicated, and complying with SSPC-Paint 5.
- F. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

- G. High-Performance Coating for Steel, Intermediate Coat: High-build urethane or epoxy coating recommended by manufacturer for application over specified zinc-rich primer under specified polyurethane enamel.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Benjamin Moore & Co.; M73/M75 Aliphatic Acrylic Urethane Semi-Gloss.
 - b. Carboline Company; Carboguard 890 2-Component Epoxy.
 - c. ICI Devoe Coatings; Devthane 378 Aliphatic Urethane Semi-Gloss Enamel.
 - d. International Coatings Limited; Interthane 870.
 - e. PPG Architectural Finishes, Inc.; Aquapon 97-130 Epoxy.
 - f. Sherwin-Williams Company (The); Macropoxy HS High Solids Epoxy.
 - g. Tnemec Company, Inc.; Series 27 Hi-Build Epoxy.
- H. High-Performance Coating for Steel, Topcoat: High-build, semigloss polyurethane enamel.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Benjamin Moore & Co.; M73/M75 Aliphatic Acrylic Urethane Semi-Gloss.
 - b. Carboline Company; Carbothane 133 HB Aliphatic Polyurethane.
 - c. ICI Devoe Coatings; Devthane378 Aliphatic Urethane Semi-Gloss Enamel.
 - d. International Coatings Limited; Interthane 870.
 - e. PPG Architectural Finishes, Inc.; Aquapon 95-612 Semi-Gloss Polyurethane.
 - f. Sherwin-Williams Company (The); Corothane II Satin B65-200 Series.
 - g. Tnemec Company, Inc.; Series 1075 Endura-Shield.
- I. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: At exterior locations and where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
 - 5. Use materials and methods that match color of base metal, minimize distortion, and develop maximum strength and corrosion resistance.
 - 6. Remove flux immediately.
 - 7. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and brazed surface matches contours of adjoining surfaces.
- H. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- I. Form changes in direction as follows:
 - 1. As detailed.
- J. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member

- throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of hollow railing members with prefabricated end fittings.
- L. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide fillers made from crush-resistant material, or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- O. For railing posts set in concrete, provide steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (12 mm) greater than outside dimensions of post, with steel plate forming bottom closure.
- P. For removable railing posts, fabricate slip-fit sockets from stainless-steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
 - 1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 STEEL AND IRON FINISHES

- A. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed railings:
 - 1. Exterior Railings (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Interior Railings (SSPC Zone 1A): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- C. Apply shop primer to prepared surfaces of railings, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
 - 1. Do not apply primer to galvanized surfaces.
 - 2. Stripe paint corners, crevices, bolts, welds, and sharp edges.
- D. High-Performance Coating Finish: Apply intermediate and finish coats to surfaces of railings primed with zinc-rich primer. Comply with coating manufacturer's written directions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Apply intermediate coat at spreading rate recommended by manufacturer to achieve a dry film thickness of 3.0 to 8.0 mils (0.076 to 0.203 mm) for epoxy intermediate coats and 1.5 to 4.0 mils (0.038 to 0.102 mm) for aliphatic urethane intermediate coats.
 - 2. Apply topcoat at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.5 to 4.0 mils (0.038 to 0.102 mm).
 - 3. Match approved Samples for color, texture, and coverage. Remove and refinish, or recoat work that does not comply with specified requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).
- C. Corrosion Protection: Coat concealed surfaces of aluminum and copper alloys that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.
- C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to 1 side, and locate joint within 6 inches (150 mm) of post.

3.4 ANCHORING POSTS

A. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with

- nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.
- D. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch (3-mm) buildup, sloped away from post.
- E. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For steel railings, weld flanges to posts and bolt to metal-supporting surfaces.
- F. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 ANCHORING RAILING ENDS

- A. Anchor railing ends to concrete and masonry with brackets on underside of rails connected to railing ends and anchored to wall construction with anchors and bolts.
- B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.

3.6 ATTACHING HANDRAILS TO WALLS

- A. Attach handrails to walls with wall brackets. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Payment for these services will be made from the Testing and Inspecting Allowance, as authorized by Change Orders.
- B. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Railings will be tested according to ASTM E 894 and ASTM E 935 for compliance with performance requirements.
- C. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and will comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 CLEANING

- A. Clean by wiping with a damp cloth and then wiping dry.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

3.9 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units.

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

- A. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. ASTM D2898 Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.
- C. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- D. AWPA U1 Use Category System: User Specification for Treated Wood; 2012.
- E. PS 20 American Softwood Lumber Standard; 2010.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. LEED Submittals: Submit applicable LEED Submittal Form for each different product made of sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, as well as locally-sourced wood, as specified in Section 01 35 15.
- D. LEED Submittal: Provide documentation indicating no added urea formaldehyde for composite wood and agrifiber products.

1.5 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

2.1 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.
- B. Lumber fabricated from old growth timber is not permitted.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.3 CONSTRUCTION PANELS

A. 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.

2.4 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.5 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. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating 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 all exterior rough carpentry items.
 - c. Do not use treated wood in direct contact with the ground.
 - d. Treat wood blocking installed in built-up thickness for roofing terminations except top layer in direct contact with roofing membrane.

- e. Basis-of-Design: Hoover-X by Hoover Treated Wood Products, Inc.: www.frtw.com.
- 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 rating 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. Treat rough carpentry items as indicated.
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
 - 1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - 2. Treat lumber in contact with roofing, flashing, or waterproofing.
 - 3. Treat lumber in contact with masonry or concrete.
 - 4. Treat lumber less than 18 inches above grade.
 - 5. Treat lumber in other locations as indicated.
 - 6. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
 - 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.
- D. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.4 lb/cu ft retention.
 - 1. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

PART 3 EXECUTION

3.1 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.

3.2 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 framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

3.3 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches 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.

SECTION 06 17 00 - ENGINEERED FRAMING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Engineered lumber framing systems for the following applications:
 - 1. Parapet cap engineered framing system.
 - 2. Window and door buck engineered framing system.
 - 3. Top and sill plate engineered framing system.

1.2 RELATED SECTIONS

- A. Section 03 30 00 Cast-in-Place Concrete.
- B. Section 05 40 00 Cold-Formed Metal Framing.
- C. Section 06 10 00 Rough Carpentry
- D. Section 07 54 16 Adhered TPO Roofing.

1.3 REFERENCES

- A. American Wood Protection Association (AWPA):
 - 1. AWPA U1-15, UC2 Interior/Damp Use.
- B. ASTM International (ASTM):
 - 1. ASTM E 518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus. (R-Value).
- C. ICC Evaluation Service:
 - 1. ICC-ES Report ESR-1387 -StrandGuard TimberStrand LSL 1.30E treated with zinc borate.
- D. NAHB Research Center:
 - 1. Green Approved Product for National Green Building Certification, Certificate 00008.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 30 00 Administrative Requirements.
- B. Product Data: Submit manufacturer's current published data including materials, standard details, and installation instructions.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5 years experience manufacturing similar products.
- B. AWPA Standards: Materials shall meet AWPA U1-15 for Use Category UC 2. Service conditions for UC2 are interior construction, above ground, damp; protected from weather, but may be subject to sources of moisture.
- C. NAHB Green Approved Product: Materials shall be NAHB Green Approved; StrandGuard TimberStrand LSL is an Green Approved Product for National Green Building Certification, Certificate 00008.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials in accordance with manufacturer's recommendations and as required to avoid damage.

1.7 PROJECT CONDITIONS

A. Maintain temperature and humidity within limits recommended by the manufacturer. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Warranty: Provide manufacturer's standard limited warranty. PART 2 PRODUCTS

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. PreBuck, which is located at: 2555 28th St. SW; Wyoming, MI 49519; Tel: 616-309-6256; Email:request info (brett@prebuckproducts.com); Web:www.prebuckproducts.com.
- B. Gorilla Buck www.gorillabuck.com.
- C. LP SolidStart LSL http://lpcorp.com.

2.2 PARAPET CAP ENGINEERED FRAMING SYSTEM

- A. Parapet Cap Engineered Framing System: StrandGuard TimberStrand LSL 1.30E Engineered Lumber by PreBuck Engineered Framing Systems.
 - 1. Meets AWPA U1-15 for Use Category 2 (UC2).
 - 2. NAHB Research Center Green Approved.
 - 3. MDI resin, 100 percent waterproof when cured.
 - 4. Treated with zinc borate through complete cross section.
 - 5. Typical material 1-1/2 inches (38 mm) thick; built-up as required.
 - 6. Round 1-1/4 inch counter sunk anchor openings at 24 inches O.C.
 - 7. Acceptable for direct contact with concrete, non-corrosive to metals, insect and fungi resistive.
 - 8. Materials: StrandGuard TimberStrand LSL 1.30E Engineered Lumber, ICC ESR-1387.
 - a. Treatment: Zinc borate through complete cross section.
 - b. Bending Strength: 1900 psi.
 - c. Tensile Strength: 1075 psi.
 - d. Shear Strength: 150 psi.
 - e. Compression Perpendicular to Grain: 670 psi.
 - f. Specific Gravity: 0.50 into the face, 0.42 into the edge.
 - g. R-value of 1-1/2 inch thickness (ASTM E 518): 1.86.

2.3 WINDOW AND DOOR BUCK ENGINEERED FRAMING SYSTEM

- A. Window and Door Buck Engineered Framing System: StrandGuard TimberStrand LSL 1.30E Engineered Lumber by PreBuck Engineered Framing Systems.
 - 1. Meets AWPA U1-15 for Use Category 2 (UC2).
 - 2. NAHB Research Center Green Approved.
 - 3. MDI resin, 100 percent waterproof when cured.
 - 4. Treated with zinc borate through complete cross section.
 - 5. Typical material 1-1/2 inches (38 mm) thick; built-up as required.
 - 6. Metal flange, 1-1/2 inch (38 mm) x 1-1/2 inch (38 mm), 20 gauge galvanized metal as applicable.
 - 7. Fasteners, 3-4 16D nails, minimum, each corner.
 - 8. Two continuous dovetail keyways at entire perimeter to eliminate air infiltration.

- 9. Non-obstructive with insulated concrete forming (ICF) web.
- 10. Unit self-aligns on wall.
- 11. Acceptable for direct contact with concrete, non-corrosive to metals, insect and fungi resistive.
- 12. Materials: StrandGuard TimberStrand LSL 1.30E Engineered Lumber, ICC ESR-1387.
 - a. Treatment: Zinc borate through complete cross section.
 - b. Bending Strength: 1900 psi.
 - c. Tensile Strength: 1075 psi.
 - d. Shear Strength: 150 psi.
 - e. Compression Perpendicular to Grain: 670 psi.
 - f. Specific Gravity: 0.50 into the face, 0.42 into the edge.
 - g. R-value of 1-1/2 inch thickness (ASTM E 518): 1.86.

2.4 TOP AND SILL PLATE ENGINEERED FRAMING SYSTEM

- A. Top and Sill Plate Engineered Framing System: StrandGuard TimberStrand LSL 1.30E Engineered Lumber by PreBuck Engineered Framing Systems.
 - 1. Meets AWPA U1-15 for Use Category 2 (UC2).
 - 2. NAHB Research Center Green Approved.
 - 3. MDI resin, 100 percent waterproof when cured.
 - 4. Treated with zinc borate through complete cross section.
 - 5. Typical material 1-1/2 inches (38 mm) thick; built-up as required.
 - 6. Countersinking cutouts for bolts.
 - 7. Wet set system for anchoring sill plates while concrete is still wet.
 - 8. Acceptable for direct contact with concrete, non-corrosive to metals, insect and fungi resistive
 - 9. Materials: StrandGuard TimberStrand LSL 1.30E Engineered Lumber, ICC ESR-1387.
 - a. Treatment: Zinc borate through complete cross section.
 - b. Bending Strength: 1900 psi.
 - c. Tensile Strength: 1075 psi.
 - d. Shear Strength: 150 psi.
 - e. Compression Perpendicular to Grain: 670 psi.
 - f. Specific Gravity: 0.50 into the face, 0.42 into the edge.
 - g. R-value of 1-1/2 inch thickness (ASTM E 518): 1.86. PART 3 EXECUTION

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install materials in accordance with manufacturer's recommendations and in proper relationship with adjacent construction. Set members level, plumb, and true to line.
- B. Coordinate construction sequence with installation of flashings and adjacent materials provided by others to prevent exterior moisture from entering or passing through completed assemblies.
- C. Remove excess and waste materials from the job.

SECTION 06 20 00 - FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Finish carpentry items.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

- A. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- B. AWI/AWMAC/WI (AWS) Architectural Woodwork Standards; 2014.
- C. AWI/AWMAC (QSI) Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- D. AWPA C2 Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.
- E. HPVA HP-1 American National Standard for Hardwood and Decorative Plywood; 2009.
- F. NEMA LD 3 High-Pressure Decorative Laminates; 2005.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide data on fire retardant treatment materials and application instructions.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.
- D. Samples: Submit two samples of finish plywood, 24 inches x 24 inch in size illustrating wood grain and specified finish.
- E. LEED Report: Submit for wood products made from sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, and locally-sourced wood, as specified in Section 01 35 15.
- F. LEED Submittals: Provide documentation of VOC content in g/L for adhesives applied within the building envelope; document no added urea formaldehyde for composite wood, agrifiber products and laminating adhesives.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom grade.
- B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
- C. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum three years of documented experience.
- D. Mockup: Build a mockup panel with samples of exposed trim, for this Project, applied to demonstrate treatment of fasteners and joints between trim sections.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire retardant requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect work from moisture damage.

1.8 PROJECT CONDITIONS

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.1 FINISH CARPENTRY ITEMS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI (AWS) for Premium Grade.
- B. Composite Wood and Agrifiber Products (installed within the building waterproofing envelope): No added urea formaldehyde.
- C. Laminating Adhesives (installed within the building waterproofing envelope): No added urea formaldehyde.
- D. Wood Adhesives (installed within the building waterproofing envelope): Comply with Section 01 61 16.

2.2 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

2.3 LUMBER MATERIALS

A. Hardwood Lumber: Maple species, plain sawn, maximum moisture content of 6 percent, of quality suitable for transparent finish.

2.4 SHEET MATERIALS

A. Hardwood Plywood: HPVA HP-1, Grade AA, Type II; Veneer core, type of glue recommended for application; Maple face species, rotary cut.

2.5 PLASTIC LAMINATE MATERIALS

- A. Plastic Laminate: NEMA LD 3, HGS; color as selected; textured, low gloss finish.
- B. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate.

2.6 ADHESIVE

- A. Adhesive: Type recommended by laminate manufacturer to suit application.
 - 1. Comply to VOC limits of Section 01 61 16.

2.7 ACCESSORIES

A. Wood Filler: Solvent base, tinted to match surface finish color.

2.8 WOOD TREATMENT

- A. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- B. Wood Preservative by Pressure Treatment (PT Type): AWPA Treatment C2 using water borne preservative with 0.25 percent retainage.
- C. Provide identification on fire retardant treated material.
- D. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- E. Redry wood after pressure treatment to maximum 19 percent moisture content.

2.9 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.
- C. Cap exposed plastic laminate finish edges with 3mm polyvinylchloride (PVC), machine applied with hot melt adhesive, inside/outside length radiused, corner radiused and buffed.
 - 1. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.
- D. Shop prepare and identify components for book match grain matching during site erection.
- E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- F. 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.
- G. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

2.10 SHOP FINISHING

- A. Apply wood filler in exposed nail and screw indentations.
- B. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- C. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 Finishing for grade specified and as follows:
 - 1. Transparent: Conversion varnish (formerly TR-4).
 - 2. Opaque: Catalyzed polyurethane (formerly OP-6).
- D. Back prime woodwork items to be field finished, prior to installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

3.2 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.

- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.3 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

SECTION 06 41 00 - ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Cabinet hardware.
- C. Factory finishing.

1.2 DEFINITIONS

A. Work of this Section is typically referred as "Millwork" on the Drawings.

1.3 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.4 REFERENCE STANDARDS

- A. ANSI A135.4 American National Standard for Basic Hardboard; 2012.
- B. ANSI A208.1 American National Standard for Particleboard; 2009.
- C. AWI/AWMAC/WI (AWS) Architectural Woodwork Standards; 2014.
- D. AWI/AWMAC (QSI) Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- E. NEMA LD 3 High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.
- F. NHLA G-101 Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2011.

1.5 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet and shelf unit substrate and finish.
- E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- F. LEED Report: Submit for wood products made from sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, and locally-sourced wood, as specified in Section 01 35 15.
- G. LEED Submittals: Provide documentation of VOC content in g/L for adhesives applied within the building waterproofing envelope; document no added urea formaldehyde for composite wood, agrifiber products and laminating adhesives.

1.6 QUALITY ASSURANCE

A. Perform cabinet construction in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated as follows:

- 1. Reception Cabinets: Premium quality.
- 2. Other Cabinets: Custom quality.
- B. Manufacturer Qualifications: Member in good standing of the Architectural Woodwork Institute (AWI) or the Architectural Woodwork Manufacturers Association of Canada (AWMAC) and familiar with the AWI/AWMAC QSI.
- C. Quality Certification: Provide inspection and quality certification of completed custom cabinets in accordance with AWI/AWMAC Quality Certification Program.

1.7 PRE-INSTALLATION MEETING

A. Convene not less than one week before starting work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.9 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.1 CABINETS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI (AWS) for Premium Grade.

2.2 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Provide composite wood and agrifiber products manufactured with glues containing no added urea-formaldehyde.

2.3 LUMBER MATERIALS

- A. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as follows:
 - 1. Exposed Surfaces: Species Maple.

2.4 PANEL MATERIALS

- A. Particleboard Core: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.
 - 1. Density: 47-pound density or as required by the referenced standard, whichever is the more stringent.
- B. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms, dust panels, and other components indicated on drawings.
- C. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

2.5 LAMINATE MATERIALS

- A. Manufacturers:
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and as follows:
 - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, .
 - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, .
 - 3. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, .
 - 4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.
- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As selected by Architect from laminate manufacturer's full range in solid colors, wood grains, and patterns, in matte finish.
 - 2. Ten different colors may be selected by Architect for this Project.

2.6 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Edges:
 - 1. Cabinet body leading edges and drawer box edging shall be flat edge 0.020 inch (0.51mm) polyvinylchloride (PVC), machine applied with hot melt adhesive.
 - 2. Doors and drawer edges and front and rear shelf edges shall be edged with 3mm polyvinylchloride (PVC), machine applied with hot melt adhesive, inside/outside length radiused, corner radiused and buffed.
 - 3. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.
- C. Fasteners: Size and type to suit application.
- D. 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.
- E. Grommets for Cable Passage through Countertops: 2-1/2 inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Product: Subject to compliance with requirements, provide "EDP series" by Doug Mockett and Co., Inc.
 - 2. Coordinate color with countertop; provide white with white countertops; black color elsewhere.

2.7 HARDWARE

- A. Hardware Standard: Hinges, pulls, catches, drawer slides, locks and latches for millwork cabinetry, to be match to hardware included under Division 12 casework section; hardware finishes to match hardware included under the Division 12 casework section.
- B. Piano Hinges:
 - 1. Material: Steel; polished nickel finish.
 - 2. Open Width: 2 inches.
 - 3. Gage: Minimum 0.04 inch.

- 4. Pin Diameter: Minimum 0.09 inch.
- 5. Basis-of-Design product Model 351.09.643 by Hafele.
- C. Surface-mounted "Rakks" Counter Brackets: L-shaped bracket fabricated from aluminum T sections; Model No. EH-1818 and EH-1824 as manufactured by Rangine Corporation.
 - 1. Load capacity per bracket: 450 pounds.
 - 2. Finish: Custom powder paint coating.
 - 3. Provide with 5/8 inch opening rubber grommet installed in 7/8 inch hole.

D. Coat Hooks:

- 1. Basis-of-Design: Model K-21 Series by Magnuson Group, Inc.; Model 980 by Datum; Model A19 by EMCO Specialty Products Inc., or comparable product.
- 2. Height: Approximately 6 inches.
- 3. Depth: Approximately 3 inches.
- 4. Width: 3/4 inch.
- 5. Finish: Anodized aluminum.

2.8 FABRICATION

- A. Cabinet Style: Flush overlay.
- B. Cabinet Doors and Drawer Fronts: Flush style.
- C. Drawer Construction Technique: Dovetail joints.
- D. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- E. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- F. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- G. 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.
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - 2. Cap exposed plastic laminate finish edges with polyvinylchloride (PVC), machine applied with hot melt adhesive.

2.9 FACTORY FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.
- C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- D. Finish work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1500, As scheduled.
- E. Match materials and finish of adjacent panels or frame when providing fillers in the final installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

3.2 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.
- 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.

3.3 ADJUSTING

A. Adjust installed work.

3.4 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Bituminous dampproofing.

1.2 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide properties of primer, bitumen, and mastics.

1.3 QUALITY ASSURANCE

1.4 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Henry Company.
- B. Karnak Corporation: www.karnakcorp.com.
- C. W.R. Meadows, Inc: www.wrmeadows.com.

2.2 FIBERED TROWEL MASTIC

- A. Blend of selected asphalts, fibers, stabilizers, fillers and solvents.
- B. Project Standard:
 - 1. Henry 793.
 - 2. Karnak 86AF Fibered Trowel Mastic.
 - 3. WR Meadows Sealmastic Trowel Mastic.

C. Characteristics:

- 1. Solvent-based.
- 2. ASTM D4586 Type 1 (Non-Asbestos).
- 3. Perm Rating: 0.25 metric perms @ 40 mils dry film or better.

2.3 FIBERED TROWEL-GRADE EMULSION MASTIC - CONTRACTOR OPTION

- A. Blend of refined asphalt, clay emulsifiers and selected non-asbestos fibers.
- B. Project Standard:
 - 1. Henry HE 785.
 - 2. Karnak 920AF Fibered Emulsion Mastic.
 - 3. W.R. Meadows Sealmastic Type 3 Trowel-On Grade.

C. Characteristics:

- 1. Select this option when applying dampproofing to concrete that has cured less than 28 days or contains greater than 5 percent moisture content.
- 2. Water-based emulsion.
- 3. ASTM D1227 Type II, Class 1.
- 4. Permeability: 0.5 mg/sq. cm or better.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 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 honeycomb in substrate.

3.3 APPLICATION

- A. Prime surfaces in accordance with manufacturer's instructions.
- B. Apply in one trowel coat, continuous and uniform, at minimum rate of 4 gal/100 sq ft.; apply free of pinholes or holidays.
- C. Seal items projecting through dampproofing surface with mastic. Seal watertight.
- D. Allow film to cure at least 48 hours prior to backfilling; backfilling must take place within 7 days of application.
- E. Notify Architect at completion of application and offer the opportunity for inspection prior to backfilling.

SECTION 07 13 00 - SHEET WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sheet membrane waterproofing.
- B. Cant strips and other accessories.
- C. Drainage panels.

1.2 REFERENCE STANDARDS

- A. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).
- B. ASTM D570 Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
- C. ASTM E96/E96M Standard Test Methods for Water Vapor Transmission of Materials; 2014.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for membrane.
- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- D. Certificate: Certify that products meet or exceed specified requirements.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Membrane Manufacturer Qualifications: Company specializing in waterproofing sheet membranes with three years experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.5 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.6 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.
- C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water , except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Carlisle Coatings & Waterproofing Inc.; Product CCW MiraDRI 860/861.

- B. Other Acceptable Laminated Composite Manufacturers:
 - 1. Grace Construction Products; Product Bituthene 3000: www.na.graceconstruction.com.
 - 2. Henry Company; Blueskin WP 200.
 - 3. Substitutions: See Section 01 60 00 Product Requirements.

2.2 APPLICATIONS

- A. Waterproof for building surfaces:
 - 1. Exterior face of foundation/building walls where finished grade is above finished floor elevation; waterproofing installed from top of footing to finished grade elevation.
 - 2. Concealed vertical face of separation of stepped floor elevations.

2.3 MEMBRANE MATERIALS

- A. Composite Laminate Membrane: Comprised of 56 mils thickness of rubberized asphalt and a 4 mils thickness of polyethylene film with release liner on adhesive-side; 60 mils total thickness.
 - 1. Tensile Strength: 325 psi, measured in accordance with ASTM D 412.
 - 2. Water Absorption: 231 percent increase in weight, maximum, measured in accordance with ASTM D 570, 24 hour immersion.
 - 3. Water Vapor Permeability: 0.05 perm inch, measured in accordance with ASTM E 96/E 96M.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Sealant: As recommended by membrane manufacturer.
- D. Termination Bars: Aluminum; compatible with membrane and adhesives.

2.4 ACCESSORIES

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side with a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core, with a vertical flow rate of 9 to 15 gpm per ft.
- B. Cant Strips: Premolded composition material; _____ manufactured by _____.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Seal cracks and joints with sealant using depth to width ratio as recommended by sealant manufacturer.

E. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.

3.3 INSTALLATION - MEMBRANE

- A. Install membrane waterproofing in accordance with manufacturer's instructions.
- B. Roll out membrane. Minimize wrinkles and bubbles.
- C. Self-Adhering Membrane: Remove release paper layer. Roll out on substrate with a mechanical roller to encourage full contact bond.
- D. Overlap edges and ends and seal by method recommended by manufacturer, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- F. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.
- G. Install flexible flashings. Seal items penetrating through membrane with flexible flashings. Seal watertight to membrane.
- H. Seal membrane and flashings to adjoining surfaces. Install termination bar at all edges. Install counterflashing over all exposed edges.

3.4 INSTALLATION - DRAINAGE PANEL

A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.

SECTION 07 16 16 - CRYSTALLINE WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Crystalline waterproofing.

1.2 REFERENCE STANDARDS

A. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; 1992.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Test data showing hydraulic permeability.
 - 2. Details for waterproofing at joints, intersections, and other special conditions.
- B. Specimen warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of products of the type specified and providing technical representatives to visit project site.
- B. Installer Qualifications: Acceptable to manufacturer, with documented experience on at least 5 projects of similar nature within the last 5 years.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Take necessary precautions to keep cementitious materials dry.

1.6 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.

1.7 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Provide installer's warranty agreeing to correct leaking waterproofing for 2 years from the Date of Substantial Completion, unless leakage is caused by structural failure, movement of the structure, or other causes beyond the installer's control.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Crystalline Waterproofing:
 - 1. Anti-Hydro International, Inc.; Hydro Cap.
 - 2. Conproco Corp.; Super Seal.
 - 3. Tamms Industries, Inc.; Hey'Di K-11.
 - 4. ThoRoc, Div. of ChemRex; Tegraproof.
 - 5. Tremco Incorporated; Permaquik Crystalline Waterproofing.
 - 6. Xypex Chemical Corporation; Xypex.

2.2 APPLICATIONS

- A. Waterproofing for building surfaces:
 - 1. Inside of elevator pits.

2.3 MATERIALS

- A. Crystalline Waterproofing: Portland cement and chemical compound that when applied to the surface of concrete forms insoluble crystals in the capillary pores preventing the passage of liquids, while having no adverse effect on the normal properties of concrete.
 - 1. Hydraulic Permeability: No measurable leakage or water flow at 200 psi pressure when tested in accordance with COE CRD-C 48, using minimum 2 inch thick sample and 20 days duration.
 - 2. Toxicity: Non-toxic.
 - 3. Color: Gray.
- B. Patching Compound: Ready-mixed cementitious mortar recommended or approved by waterproofing manufacturer.

PART 3 EXECUTION

3.1 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. Use sand blasting, water blasting, or acid etching as recommended.
- C. Plug water leaks.
- D. Patch holes, construction joints, and cracks. Remove defective concrete.
- E. Obtain approval of manufacturer's field representative before beginning installation.

3.2 INSTALLATION

- A. Install in strict accordance with manufacturer's instructions. Maintain environmental conditions required and recommended by manufacturer. Keep a copy of manufacturer's instructions on site.
- B. Coordinate installation with installation of products that must penetrate waterproofed surfaces.
- C. Prevent excessive drying of surface.
 - 1. Cure waterproofing for at least 3 days, or length of time required by manufacturer, with water spray and adequate air circulation.
 - 2. Do not use chemical curing agents unless explicitly approved by waterproofing manufacturer
- D. Do not backfill, fill water or liquid holding structures, or apply finish coatings until time period recommended by manufacturer has passed.

SECTION 07 18 00 - TRAFFIC COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes traffic coatings for the interior exposed concrete floors.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. LEED Submittals: Provide documentation of VOC content in g/L for adhesives, sealants, primers and coatings applied within the building waterproofing envelope; comply with Section 01 61 16 VOC Restrictions.
- C. Shop Drawings: Show extent of each traffic coating. Include details for treating substrate joints and cracks, flashings, deck penetrations, and other termination conditions.
- D. Samples for Initial Selection: For each type of finish indicated.
- E. Qualification Data: For Installer.
- F. Material Test Reports: For each traffic coating.
- G. Material Certificates: For each traffic coating, signed by manufacturers.
- H. Field quality-control test reports.
- I. Maintenance Data: For traffic coatings to include in maintenance manuals. Identify substrates and types of traffic coatings applied. Include recommendations for periodic inspections, cleaning, care, maintenance, and repair of traffic coatings.
- J. Warranty: Special warranty specified in this Section.

1.3 PERFORMANCE REQUIREMENTS

A. Base Membrane: VOC compliant, high adhesion, liquid polyurethane membrane and shall meet or exceed the following typical performance properties:

	Property	Typical Value	ASTM Method
1.	Composition	Aromatic Urethane	
2.	Solids by Weight	85%	C 1250
3.	Hardness, Shore A	63	D 2240
4.	Tensile Strength	850 PSI	D 412
5.	Ultimate Elongation	625%	D 412
6.	Tear Resistance	140 lb/in	D 624
7.	Adhesion to Concrete	23 PLI	D 903
8.	Low Temp. Flexibility	-650F	D 522

B. Traffic-Resistant Top Coat: VOC compliant, high tensile strength, abrasion-resistant and weather-resistant aliphatic elastomeric polyurethane and shall meet or exceed the following typical performance properties:

	Property	Typical Value	ASTM Method
1.	Composition	Aliphatic Urethane	
2.	Solids by Weight	72%	C 1250
3.	Hardness, Shore A	91	D 2240
4.	Tensile Strength	3200 PSI	D 412
5.	Ultimate Elongation	190%	D 412
6.	Tear Resistance, Die C	300 lb/in.	D 624

7.	Low Temp. Flexibility	Pass	C 957
	And Crack Bridging		
8.	Weather Resistance	No Chalking at 2000 hrs.	G 53
9.	Water Permeability (system)	< 1.0 Perm	E 96 B
10.	Abrasion Resistance (system)	< 50 mg.	C 501

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of traffic coatings required for this Project.

B. Source Limitations:

- 1. Obtain traffic coatings from a single manufacturer.
- 2. Obtain primary traffic coating materials, including primers, from traffic coating manufacturer. Obtain secondary materials including aggregates, sheet flashings, joint sealants, and substrate repair materials of type and from source recommended in writing by primary material manufacturer.

C. Preinstallation Conference:

1. Before installing traffic coatings, meet with representatives of authorities having jurisdiction, manufacturer's technical representative, Owner, Architect, consultants, independent testing agency, and other concerned entities. Review requirements for traffic coatings. Notify participants at least seven days before conference.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels showing the following information:
 - 1. Manufacturer's brand name.
 - 2. Type of material.
 - 3. Directions for storage.
 - 4. Date of manufacture and shelf life.
 - 5. Lot or batch number.
 - 6. Mixing and application instructions.
 - 7. Color.
- B. Store materials in a clean, dry location protected from exposure to direct sunlight. In storage areas, maintain environmental conditions within range recommended in writing by manufacturer.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Apply traffic coatings within the range of ambient and substrate temperatures recommended in writing by manufacturer. Do not apply traffic coatings to damp or wet substrates, when temperatures are below 40 deg F, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.
- B. Do not install traffic coating until items that will penetrate membrane have been installed.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which traffic coating manufacturer agrees to repair or replace traffic coatings that deteriorate during the specified warranty period. Warranty does not include deterioration or failure of traffic coating due to unusual phenomena, failure of prepared and treated substrate, formation of new substrate cracks exceeding 1/16 inch in width, fire, vandalism, or abuse by maintenance equipment.

- 1. Deterioration of traffic coatings includes the following:
 - a. Adhesive or cohesive failures.
 - b. Abrasion or tearing failures.
 - c. Surface crazing or spalling.
 - d. Intrusion of water, oils, gasoline, grease, or acids into deck substrate.
- 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Traffic Coatings: Complying with ASTM C 957.
- B. Material Compatibility: Provide primers; base, intermediate, and topcoats; and miscellaneous materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- C. Emissions: Comply with low-emitting requirements in Section 016116 for primer, adhesive, sealant, traffic coating.

2.2 TRAFFIC COATING

- A. Basis-of-Design: Tremco Incorporated, Sealant/Waterproofing Division; Vulkem 350/351.
- B. Other Available Manufacturers: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Karnak Corporation.
 - 2. Carlisle Coatings and Waterproofing, Inc.
 - 3. Neogard.
 - 4. BASF.
- C. Primer: Manufacturer's standard factory-formulated primer recommended for substrate and conditions indicated.
 - 1. Material: Urethane.
- D. Preparatory and Base Coats: Single- or multicomponent, aromatic liquid urethane elastomer.
- E. Topcoat: Single- or multicomponent, aliphatic liquid urethane elastomer.
 - 1. Color: As selected by Architect from manufacturer's full range.
- F. Component Coat Thicknesses: As recommended by manufacturer for substrate and service conditions indicated, but not less than the following (measured excluding aggregate):
 - 1. Base Coat: 32 mils minimum wet film thickness.
 - 2. Top Coat: 16 mils minimum wet film thickness.
- G. Aggregate: Uniformly graded, washed silica sand of particle sizes, shape, and minimum hardness recommended in writing by traffic coating manufacturer.
 - 1. Spreading Rate: As recommended by manufacturer for substrate and service conditions indicated, but not less than the following:
 - a. Top Coat: 8 to 10 lb/100 sq. ft., follow with backroll to encapsulate the sand.

2.3 MISCELLANEOUS MATERIALS

- A. Joint Sealants: As specified in Division 7 Section "Joint Sealants."
- B. Sheet Flashing: Nonstaining.
 - 1. Minimum Thickness: 60 mils thickness.
 - 2. Material: Sheet material recommended in writing by traffic coating manufacturer.

- C. Adhesive: Contact adhesive recommended in writing by traffic coating manufacturer.
- D. Reinforcing Strip: Fiberglass mesh recommended in writing by traffic coating manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements and for other conditions affecting performance of traffic coatings.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 - 2. Verify compatibility with and suitability of substrates.
 - 3. Begin coating application only after minimum concrete curing and drying period recommended by traffic coating manufacturer has passed, after unsatisfactory conditions have been corrected, and after surfaces are dry.
 - 4. Verify that substrates are visibly dry and free of moisture.
 - a. Test for moisture vapor transmission by plastic sheet method according to ASTM D 4263.
 - b. Test for moisture content by method recommended in writing by manufacturer.
 - 5. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Clean and prepare substrates according to ASTM C 1127 and manufacturer's written recommendations to produce clean, dust-free, dry substrate for traffic coating application.
- B. Mask adjoining surfaces not receiving traffic coatings, deck drains, and other deck substrate penetrations to prevent spillage, leaking, and migration of coatings.
- C. Concrete Substrates: Mechanically abrade concrete surfaces to a uniform profile according to ASTM D 4259. Do not acid etch.
 - 1. Remove grease, oil, paints, and other penetrating contaminants from concrete.
 - 2. Remove concrete fins, ridges, and other projections.
 - 3. Remove laitance, glaze, efflorescence, curing compounds, concrete hardeners, form-release agents, and other incompatible materials that might affect coating adhesion.
 - 4. Remove remaining loose material to provide a sound surface, and clean surfaces according to ASTM D 4258.

3.3 TERMINATIONS AND PENETRATIONS

- A. Prepare vertical and horizontal surfaces at terminations and penetrations through traffic coatings and at expansion joints, drains, and sleeves according to ASTM C 1127 and manufacturer's written recommendations.
- B. Provide sealant cants at penetrations and at reinforced and nonreinforced, deck-to-wall butt joints.
- C. Terminate edges of deck-to-deck expansion joints with preparatory base-coat strip.
- D. Install sheet flashings at deck-to-wall expansion and dynamic joints, and bond to deck and wall substrates according to manufacturer's written recommendations.

3.4 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout, and fill joints and cracks in substrates according to ASTM C 1127 and manufacturer's written recommendations. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.
 - 1. Comply with recommendations in ASTM C 1193 for joint-sealant installation.

3.5 TRAFFIC COATING APPLICATION

- A. Apply traffic coating material according to ASTM C 1127 and manufacturer's written recommendations.
 - 1. Start traffic coating application in presence of manufacturer's technical representative.
 - 2. Verify that wet film thickness of each component coat complies with requirements every 100 sq. ft.
- B. Apply traffic coatings to prepared wall terminations and vertical surfaces to height indicated, and omit aggregate on vertical surfaces.
- C. Cure traffic coatings according to manufacturer's written recommendations. Prevent contamination and damage during application and curing stages.

3.6 FIELD QUALITY CONTROL

- A. Testing: Engage a qualified testing agency to perform the following field tests and inspections and prepare test reports:
 - 1. Testing agency shall verify thickness of coatings during traffic coating application.
 - 2. If test results show traffic coating materials do not comply with requirements, prepare surfaces and reapply traffic coatings.
- B. Final Traffic Coating Inspection: Arrange for traffic coating manufacturer's technical personnel to inspect membrane installation on completion.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 PROTECTING AND CLEANING

- A. Protect traffic coatings from damage and wear during remainder of construction period.
- B. Clean spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

SECTION 07 21 00 - THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Board insulation at cavity wall construction, perimeter foundation wall, and underside of floor slabs.
- B. Batt insulation and vapor retarder in exterior wall construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.2 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
- E. LEED Submittal: Provide documentation indicating VOC content in g/L for adhesives applied within the building waterproofing envelope low-emitting requirements for insulation as specified in Section 01 61 16.

1.4 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Insulation Under Concrete Slabs: Extruded polystyrene board.
- B. Insulation at Perimeter of Foundation: Extruded polystyrene board.
- C. Insulation Inside Masonry Cavity Walls: Extruded polystyrene board.
- D. Insulation in Metal Framed Walls: Batt insulation with separate vapor retarder.

2.2 GENERAL

- A. Insulation and adhesive installed within the waterproofing envelope: Comply with low-emitting requirements as specified in Section 01 61 16.
- B. Recycled Content: Provide insulation with the highest recycled content feasible.
- C. Regional Materials: Give preference to insulation manufactured and of primary raw materials extracted or recovered within 500 mile radius of project site.

2.3 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene Board Insulation: Extruded polystyrene board; ASTM C 578, Type X and Type VI; with either natural skin or cut cell surfaces, and the following characteristics:
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. R-value; 1 inch of material at 72 degrees F: 5, minimum.
 - 4. Board Edges: Square.
 - 5. Thermal Conductivity (k factor) at 25 degrees F: 0.18.
 - 6. Compressive Resistance: 15 psi at vertical applications; 40 psi at foundation perimeter.
 - 7. Board Density: 1.3 lb/cu ft.
 - 8. Water Absorption, Maximum: 0.3 percent, by volume.
 - 9. Manufacturers:
 - a. Dow Chemical Co: www.dow.com.
 - b. Owens Corning Corp: www.owenscorning.com.
 - c. Kingspan Insulation LLC; www.trustgreenguard.com.
- B. Adhesive: Provide letters from the insulation manufacturer and vapor retarder manufacturer confirming compatibility of adhesive recommended by insulation manufacturer for applying cavity insulation.

2.4 BATT INSULATION MATERIALS

- A. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
 - 3. Combustibility: Non-combustible, when tested in accordance with ASTM E 136, except for facing, if any.
 - 4. Facing: Aluminum foil, flame spread 25 rated; one side.
 - 5. Manufacturers:
 - a. CertainTeed Corporation: www.certainteed.com.
 - b. Johns Manville Corporation: www.jm.com.
 - c. Knauf Insulation: www.knaufusa.com
 - d. Owens Corning Corp: www.owenscorning.com.
- B. Unfaced Batt Insulation: ASTM C 665, Type I.
- C. Sustainability Requirements: Provide glass-fiber insulation as follows:
 - 1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
 - 2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
- B. Install boards horizontally on foundation perimeter.
 - 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.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.3 BOARD INSTALLATION AT CAVITY WALLS

- A. Adhere over outer face of block backup.
- B. Apply the insulating board to the outer surface of the inner masonry wythe with sufficient manual pressure to assure tight joint and good contact.
- C. Locations: At exterior cavity masonry walls and lining concrete block backup, around the building, as detailed or scheduled.
- D. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
- E. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.
- F. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.4 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.5 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- G. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
- H. Tape seal tears or cuts in vapor retarder.
- I. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

SECTION 07 21 27 - ENCLOSED CAVITY FOAMED INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Foamed-in-place insulation in masonry cavity walls.

1.2 REFERENCES

- A. ASTM C 177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- B. ASTM D 1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- C. ASTM D 1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- D. ASTM D 2842 Standard Test Method for Water Absorption of Rigid Cellular Plastics.
- E. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials.
- G. ASTM E 2357 Standard for Air Barrier Materials.
- H. NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory test Apparatus.

1.3 SUBMITTALS

- A. Product Data: Provide product description, insulation properties, and preparation requirements.
- B. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.
- C. ICC-ES Evaluation Report to establish code compliance and R-Value.
- D. Submit proof of compliance with NFPA 285 for Masonry as well as Rain Screen wall assemblies if applicable.
- E. Submit certification of ASTM E-2357 compliance.
- F. Submit proof of ABAA- Assembly Testing and Letter from Manufacturer stating SPF contractor in Approved to install Air Barrier SPF Product.
- G. LEED Submittal: Provide documentation indicating VOC content in g/L for adhesives and primers applied within the building waterproofing envelope; as specified in Section 01 61 16.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than five years of documented experience.
- B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum three years of experience.
- C. Contractor shall be certified by ABAA for SPF air barrier systems. Contractor shall include ABAA inspection and reports, submitted to Architect at each stage.
- D. Contractor shall provide a written Safety Program, written Respirator Program and a written Job Hazard Analysis.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke limitations.

1.6 MOCK-UP

A. Include within mock-up for masonry assemblies.

1.7 PRE-INSTALLATION MEETING

- A. Convene prior to mock-up and three weeks prior to commencing Work of this section. Review non-standard details, unusual conditions, and quality control procedures for this project.
 - 1. The following be in addendance: SPF Contractor, General Contractor, Sheathing and or Masonry Contractors, Owner's representative and Architect.

1.8 FIELD CONDITIONS

A. Do not install insulation when ambient temperature is lower than 40 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design:
 - 1. Permax 2.0 by Henry Company.
- B. The following manufacturer's will be considered as equal providing they meet performance properties specified and current local code requirements:
 - 1. Ecobay CC by Bayer Materials Sciences.
 - 2. Permax 2.0 by Henry CompanyWalltite by BASF; www.basf-pfe.com.
 - 3. Corobond III by Johns Manville Company.
 - 4. MD-C-200 by Icynene; www.icynene.com.

2.2 MATERIALS

- A. Insulation: Polyurethane type.
 - 1. Thermal Conductivity: When tested in accordance with ASTM C 518:
 - 2. Initial k value: 0.147.
 - 3. Water Vapor Transmission: 1.82 perms (1 inch SPF), measured in accordance with ASTM E 96.
 - 4. Air Permeance: 0.000025 L/s/sq. m. at 75 Pa, when tested in accordance with ASTM E 2178.
 - 5. Compressive Strength: 22 psi, when tested in accordance with ASTM D 1621.
 - 6. Density: 2.0 lb/cu ft, when tested in accordance with ASTM D 1622.
 - 7. Surface Burning Characteristics: Flame spread/Smoke developed index of 25 / 350, when tested in accordance with ASTM E 84 (4 inches SPF thickness).
 - 8. R-Value: Minimum of R-16.75.
 - 9. Thickness: 2 1/2 inches.
 - a. Variation from thickness will be no more than plus 1/2 inch and no less than minus 1/4 inch.
- B. Adhesives, primers applied within the building waterproofing envelope: Comply withlow-emitting requirements in Section 01 61 16.
- C. Flexible Flashing CMU Backup: For flashing not exposed to the exterior, use the following, unless otherwise indicated:

1. Performance Requirements:

- a. Tensile Strength (Membrane): ASTM D412 Die C; 800 psi.
- b. Tensile Strength (Film): ASTM D412 Die C; 5,000 psi.
- c. Elongation: ASTM D412 Die C; 200 percent miminum.
- d. Puncture Resistance: ASTM E154; minimum 134 pound.
- e. Tear Resistance-Initial: ASTM D1004; minimum 45 pound.
- f. Tear Resistance-Propagation: ASTM D1938; minimum 5.0 lbf/in. width.
- g. Permeance: ASTM E96-B; 0.03 perms maximum.
- h. Water Absorption: ASTM D570; 0.1 percent maximum.

2. Product:

a. Basis-of-Design: Blueskin TWF, Manufactured by Henry.

2.3 ACCESSORIES

- A. Primer: As required by insulation manufacturer.
- B. Transition Membrane Compatible with the insulation manufacturer and in locations as detailed in the drawings and at the following:
 - 1. Grade from face of wall, overlap below grade membrane where applicable.
 - 2. Parapet from outside face of wall, over top of parapet and under roof membrane.
 - 3. Dissimilar materials.
 - 4. Masonry control joints.
 - 5. Head, jamb, and sills of windows, doors, and other wall openings.
 - 6. Basis-of-Design Product: Blueskin SA, Manufactured by Henry.

PART 3 EXECUTION

3.1 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 adhesion.

3.2 PREPARATION

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.
- C. Provide transition membranes between dissimilar materials all instances.

3.3 APPLICATION

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Apply insulation by spray method, to a uniform monolithic density without voids.
- C. Thickness Tolerance: $\pm 1/4$ -inch.
- D. Clear foam from masonry veneer anchors to permit free movement within full limit of tie slots.
- E. Patch damaged areas.

3.4 FIELD QUALITY CONTROL

A. Field inspections and tests to be performed by an independent testing agency. Contractor is to coordinate with and provide full access to Work that the independent testing agency will be inspecting.

B. Inspection will include verification of insulation and overcoat thickness and density.

SECTION 07 26 70 - MECHANICALLY-ATTACHED AIR AND MOISTURE BARRIER

PART 1 GENERAL

1.1 SUMMARY

A. Section includes air leakage criteria for primary air seal building enclosure materials and assemblies; and air seal materials to connect and seal openings, joints, and junctions between other air seal materials and assemblies.

1.2 DEFINITIONS

A. Air Barrier: Continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of single material or combination of materials to achieve performance requirements.

1.3 PERFORMANCE REQUIREMENTS

- A. Air Penetration: Meeting requirements for Type 1 per ASTM E1677.
- B. Water Vapor Transmission: 50 grams per meter square per day or 10 perms, or better, tested in accordance with ASTM E96, Method A or B, or ASTM F1249.
- C. Tensile Strength: Minimum 27/24 lbs/in tested in accordance with ASTM D882, Method A.
- D. Tear Resistance: Minimum 12/10 lbs. tested.
- E. Allowable UV Exposure Time: Not less than three months.
- F. Surface Burning Characteristics: Class A per ASTM E84.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate special joint conditions and sealing applicable penetrations.
- B. Product Data: Submit data on material characteristics and performance criteria, indicating compliance with requirements.
- C. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.
- D. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative in the direct employ of the manufacturer, indicating observation of air barrier assembly installation.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Provide commercial air barrier and accessory materials produced by single manufacturer.
- B. Pre-installation Meeting:
 - 1. Hold a pre-installation conference, two weeks prior to start of air barrier installation. Attendees shall include Contractor, Architect, Installer, and Air Barrier Manufacturer's Designated Representative.
 - 2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of air barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.6 MOCKUP

A. Construct mock-up of air barrier system, within Project's exterior wall mockup required by other sections.

1.7 SEQUENCING

A. Sequence Work to permit installation of materials in conjunction with related materials and seals.

PART 2 PRODUCTS

2.1 AIR BARRIERS

- A. Air Barrier Manufacturers:
 - 1. Dupont Tyvek CommercialWrap.
 - 2. WrapShield by VaproShield LLC.
 - 3. Metro Wrap by Typar.
- B. Accessory Manufacturers:
 - 1. Quickflash Weatherproofing Products, Inc.

2.2 COMPONENTS

- A. Sheet: Product listed with manufacturer.
- B. Tape: Self adhering type; mesh reinforced and compatible with sheet material.
 - 1. Provide standard tape of sheet manufacturer.
- C. Fasteners: As manufactured or accepted by sheet manufactuer.
 - 1. Cap screws for cold formed metal frame construction; 2-inch cap or washer.
 - 2. #4 nails with large 1-inch plastic cap fasteners for wood frame construction.
- D. Sealants: Provide sealants complying with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
- E. Primers: Provide manufacturer recommended primer to improve adhesion between substrate and flashing materials.
- F. Flashing: Flexible flashing material for openings penetration; dual-sided membrane materials for brick mold and non-flanged windows and doors.
- G. Accessories:
 - 1. Prefabricated accessories for penetration.
 - 2. Provide the appropriate flashing panel by Quickflash Weatherproofing Products, Inc., for all plumbing, gas, mechanical and electrical penetration.
 - a. Flashing panels for A/C line sets (Model A/C 150 C or Model A/C 250 C) to be field painted to match adjacent materials.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean and prime substrate surfaces to receive adhesive and sealants.

3.2 INSTALLATION

A. Install air barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

- B. Install air barrier prior to installation of windows and doors.
- C. Start air barrier installation at a building corner, leaving 6-12 inches of air barrier extended beyond corner to overlap.
- D. Install air barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers.
- E. Maintain air barrier plumb and level.
- F. Sill Plate Interface: Extend lower edge of air barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by air barrier manufacturer.
- G. Window and Door Openings: Extend air barrier completely over openings.
- H. Overlap air barrier.
 - 1. Exterior corners: Minimum 12 inches.
 - 2. Seams: minimum 6 inches.

I Penetrations:

- 1. Install prefabricated flashing panels as directed by manufacturer.
- 2. Place air barrier up behind bottom of flashing panel to bottom of protrusion.
- 3. Place subsequent layer of air barrier over top of flashing panel to bottom front edge or further down; tape seal bottom edge full length to underlying sheet and tape seal cut edges to flashing panel.
- J. Air Barrier Attachment:
 - 1. Attach air barrier to cold-formed metal studs through exterior sheathing.
 - 2. Secure using air barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
- K. Apply 4 inch by 7 inch piece of self-adhering flashing to air barrier membrane prior to the installation cladding anchors.

3.3 SEAMING

- A. Seal seams of air barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by air barrier manufacturer.

3.4 OPENING PREPARATION - NON-FLANGED OPENING FRAMES

- A. Flush cut air barrier at edge of sheathing around full perimeter of opening.
- B. Cut a head flap at 45-degree angle in the air barrier at window head to expose 8 inches of sheathing. Temporarily secure air barrier flap away from sheathing with tape.

3.5 FLASHING - NON-FLANGED OPENING FRAMES

- A. Cut self-adhering flashing a minimum of 12 inches longer than width of sill rough opening; apply primer as required by manufacturer.
 - 1. Provide 7-inch wide flashing for 2 by 4 framing.
 - 2. Provide 9-inch wide flashing for 2 by 6 framing.
- B. Cover horizontal sill by aligning self-adhering flashing edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan self-adhering flashing at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

- D. Apply 9-inch wide strips of self-adhering flashing at jambs. Align flashing with interior edge of jamb framing. Start self-adhering flashing at head of opening and lap sill flashing down to the sill.
- E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- F. Install self-adhering flashing at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
- G. Coordinate flashing with window installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
- I. Position air barrier head flap across head flashing. Adhere using 4-inch wide self-adhering flashing over the 45-degree seams.
- J. Tape top of window in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.6 OPENING PREPARATION - FLANGED OPENING FRAMES

- A. Cut air barrier in a modified "I-cut" pattern.
 - 1. Cut air barrier horizontally along the bottom of the header.
 - 2. Cut air barrier vertically 2/3 of the way down from top center of window opening.
 - 3. Cut air barrier diagonally from bottom of center vertical cut to the left and right corners of the opening.
 - 4. Fold side and bottom air barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the air barrier at window head to expose 8 inches of sheathing. Temporarily secure air barrier flap away from sheathing with tape.

3.7 FLASHING - FLANGED OPENING FRAMES

- A. Cut self-adhering flashing a minimum of 12 inches longer than width of sill rough opening.
 - 1. Provide 7-inch wide flashing for 2 by 4 framing.
 - 2. Provide 9-inch wide flashing for 2 by 6 framing.
- B. Cover horizontal sill by aligning self-adhering flashing edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan self-adhering flashing at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch wide strips of self-adhering flashing at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of self-adhering flashing as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.

- H. Position air barrier head flap across head flashing. Adhere using 4-inch wide self-adhering flashing over the 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations.
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.8 FIELD QUALITY CONTROL

A. Notify manufacturer's designated representative to obtain periodic observations of air barrier assembly installation.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit adjacent work to damage work of this Section.

SECTION 07 27 10 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes fluid-applied membrane air barrier, vapor permeable.

1.2 DEFINITIONS

- A. ABAA: Air Barrier Association of America.
- B. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1.4 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.
- B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 1. Include details of interfaces with other materials that form part of air barrier.
 - 2. Include details of mockups.
- C. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.
- D. Qualification Data: For Applicator.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Preinstallation Conference: Conduct conference at Project site.
 - Include installers of other construction connecting to air barrier, including masonry, sheathing, sealants, windows, glazed curtain walls, and door frames.
 - 2. Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, and protection and repairs.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.
- B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- C. Store rolls according to manufacturer's written instructions.
- D. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

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

PART 2 PRODUCTS

2.1 FLUID-APPLIED MEMBRANE AIR BARRIER

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Synthetic polymer membrane.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Synthetic Polymer Membrane:
 - 1) ExoAir 220 by Tremco Sealants.
 - 2) Air Block 31 by Henry.
 - 3) Permabarrier VP by WR Grace.
 - 4) Enershield HP by BASF
 - 2. Physical and Performance Properties:
 - a. Membrane Air Permeance: Not to exceed 0.0045 cfm/ sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
 - b. Membrane Vapor Permeance: Not less than 5.5 perms; ASTM E 96.

2.2 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid waterborne primer recommended for substrate by manufacturer of air barrier material.
- C. Counterflashing Strip: Modified bituminous, 40-mil thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil-thick, crosslaminated polyethylene film with release liner backing.
 - 1. Location: Counterflashing metal flashing within wall section.
- D. Butyl Strip: Vapor-retarding, 30 to 40-mil thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
 - 1. Location: Termination at thermoplastic materials.
- E. Modified Bituminous Strip: Vapor-retarding, 40-mil thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil thick polyethylene film with release liner backing.
 - 1. Location: Termination with compatible membranes.

- F. Joint Reinforcing Strip: Air barrier manufacturer's glass-fiber-mesh tape.
- G. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- H. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- I. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
 - 1. Provide to fill gaps at penetrations and openings.
- J. Modified Bituminous Transition Strip: Vapor-retarding, 40-mil thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil thick polyethylene film with release liner backing.
 - 1. Provide for terminations with windows, doors, curtain walls and storefront systems.
- K. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.
 - 1. Pecora Corporation's "Sil-Span"
 - 2. Dow Corning Corporation's "123 Silicone Seal"
 - 3. GE Silicones' "UltraSpan US1100"
 - 4. Tremco Incorporated's "Spectrem EZ Seal"
- L. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Division 7 Section "Joint Sealants."
- M. Prefabricated Flashing Accessories:
 - 1. Prefabricated accessories for penetrations not indicated for metal flashings, at point of penetration of substrate construction.
 - 2. Provide the appropriate flashing panel by Quickflash Weatherproofing Products, Inc., for all plumbing, gas, mechanical and electrical penetration.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

D. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 JOINT TREATMENT

A. Gypsum Sheathing: Fill joints greater than 1/4 inch with sealant according to ASTM C 1193 and with air barrier manufacturer's written instructions. Apply first layer of fluid air barrier membrane at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air barrier membrane over joint reinforcing strip.

3.4 TRANSITION STRIP INSTALLATION

- A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
- B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
 - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- D. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition so that a minimum of 3 inches of coverage is achieved over both substrates. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- G. Seal strips and transition strips around masonry ties and penetrations with termination mastic.
- H. Seal top of through-wall flashings to air barrier with an additional 6-inch wide, counterflashing strip.
- I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
 - 1. Install prefabricated flashing panels as directed by manufacturer.
- J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.5 AIR BARRIER MEMBRANE INSTALLATION

- A. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
- B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
- C. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.

- 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- D. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
 - 1. Vapor-Permeable Membrane Air Barrier: Minimum 40-mil dry film thickness.
- E. Apply strip and transition strip a minimum of 1 inch onto cured air membrane or strip and transition strip over cured air membrane overlapping 3 inches onto each surface according to air barrier manufacturer's written instructions.
- F. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air barrier system has been achieved with no gaps or holes.
 - 2. Continuous structural support of air barrier system has been provided.
 - 3. Site conditions for application temperature and dryness of substrates have been maintained.
 - 4. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 5. Surfaces have been primed, if applicable.
 - 6. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
 - 7. Termination mastic has been applied on cut edges.
 - 8. Strips and transition strips have been firmly adhered to substrate.
 - 9. Compatible materials have been used.
 - 10. Transitions at changes in direction and structural support at gaps have been provided.
 - 11. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
 - 12. All penetrations have been sealed.

3.7 CLEANING AND PROTECTION

- A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed for more than 30 days.
 - 2. Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Remove masking materials after installation.

SECTION 07 42 13 - METAL WALL PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Factory-formed and field-assembled, concealed-fastener, lap-seam, profiled metal wall panels.

1.2 DEFINITION

- A. Metal Wall Panel Assembly: Metal wall panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight system.
- B. Steel Sheet Thickness: Minimum thickness of base metal without metallic coatings or painted finishes.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide metal wall panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.
- B. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft.
- C. Water Penetration: No water penetration when tested according to ASTM E 331 at a minimum differential pressure of 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. ft. and not more than 12 lbf/sq. ft.
- D. Horizontal joint design shall demonstrate pressure equalization in accordance with AAMA 508-07, which includes static and dynamic testing with imperfect air barriers; a third party test indicating successful passing of this test must be submitted.
 - 1. Panel systems that have not successfully passed AAMA 508-07 shall provide a backup system including a membrane that meets the air and water infiltration values as listed above.
- E. Structural Performance: Provide metal wall panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592.
- F. Wind Loads: International Building Code 2009; Factory Mutual Global and ASCE 7.
- G. Deflection Limits: Engineer metal wall panel assemblies to withstand test pressures with deflection no greater than 1/180 of the span and no evidence of material failure, structural distress, or permanent deformation exceeding 0.2 percent of the clear span, unless Code requires greater requirements.
- H. Seismic Performance: International Building Code 2009; and comply with ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads.
- I. Thermal Movements: Provide metal wall panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal wall panel and accessory.
- B. Qualification Data: For installer, manufacturer and professional engineer; include 5 copies.
- C. Shop Drawings: Include required sets prepared by or under the supervision of a qualified professional engineer licensed in the State of Maryland, detailing fabrication and assembly of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory and field-assembled work.
 - 1. Accessories: Include details of the flashing and trim, at a scale of not less than 1-1/2 inches per 12 inches.
 - 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 3. Engineer to be employed by the manufacturer and licensed in the State of Maryland.
- D. Coordination Drawings: Exterior elevations drawn to scale and coordinating penetrations and wall-mounted items. Show the following:
 - 1. Wall panels and attachments.
 - 2. Girts or framing.
 - 3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
- E. Samples for Verification:
 - 1. For each type of exposed finish required.
 - 2. Metal Wall Panels: Actual panel width; minimum 12 inch length. Include fasteners, closures, and other metal wall panel accessories.
- F. Qualification Data: For installer and Professional Engineer.
- G. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:
 - 1. Materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for the following:
 - 1. Metal Wall Panels: Include reports for air infiltration, water penetration, and structural performance.
- I. LEED Submittals:
 - 1. Product data for Credit MR 5.1 and Credit 5.2: For products having regional material content, documentation indicating location of manufacture and location of extraction or recovery of primary raw materials.
 - a. Include statement indicating cost of each product with regional material content.
 - 2. Product Data for Credit MR 4.1 and MR 4.2: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content; include statement indicating costs of each product having recycled content.
- J. Maintenance Data: For metal wall panels to include in maintenance manuals.

K. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Manufacturer Qualifications: Manufacturer capable of providing engineering and field service representation during construction and approving acceptable installer.
 - 1. Engineering Responsibility: Preparation of data for including the following:
 - a. Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in the State of Maryland.
 - 2. Company with a minimum of ten years of continuous experience manufacturing panel material of the type specified and capable of providing the following information.
 - 3. List of five other projects of similar size, including approximate date of installation and name of Architect for each.
- C. Source Limitations: Obtain each type of metal wall panel through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of metal wall panels and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
 - 2. Submit no fewer than nine pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
- E. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects.
 - 1. Provide components for installation in mock-ups, as indicated in Section 04 20 00 and the Drawings.
 - 2. Approval of mockups is for other material and construction qualities specifically approved by Architect in writing.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
- F. Preconstruction Conference: Before starting wall framing, sheathing, or girt construction, conduct conference at Project site. Review methods and procedures related to wall construction and metal wall panels including, but not limited to, the following:
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal wall panel Installer, metal wall panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal wall panels including installers of doors, windows, and louvers.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review methods and procedures related to metal wall panel installation, including manufacturer's written instructions.

- 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
- 5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
- 6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
- 7. Review temporary protection requirements for metal wall panel assembly during and after installation.
- 8. Review wall panel observation and repair procedures after metal wall panel installation.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.
- B. Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal wall panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect strippable protective covering on metal wall panels from exposure to sunlight and high humidity, except to extent necessary for period of metal wall panel installation.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal wall panel fabrication and indicate measurements on Shop Drawings.

1.8 COORDINATION

A. Coordinate metal wall panel assemblies with rain drainage work, flashing, trim, and construction of girts, studs, soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

19 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PANEL MATERIALS

- A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality; having recycled content.
 - 2. Surface: Smooth finish as standard for manufacturer and gage.
 - 3. Exposed Finishes:
 - a. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1) Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
 - 5. Recycled Content: Provide steel 25 percent post-consumer recycled content.with minimum 30 percent total recycled content including at least
 - 6. Regional Materials: To the extent necessary to meet required LEED threshold, provide steel products manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.

B. Panel Sealants:

- 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- 2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacturer.
- 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 MISCELLANEOUS METAL FRAMING

- A. Steel Sheet Components, General: Complying with ASTM C 645 requirements for metal and with ASTM A 653, G60, hot-dip galvanized zinc coating and having recycled content.
- B. Subgirts: Fabricated from minimum 16 gage zinc coated steel conforming to ASTM A 653 SQ Grade 37, G90 coating.
- C. Zee Clips: 0.079-inch bare steel thickness, cold-formed, galvanized steel sheet.
- D. Base or Sill Channels: 0.079-inch bare steel thickness, cold-formed, galvanized steel sheet.
- E. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

F. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal wall panels by means of plastic caps or factory-applied coating.
 - 1. Fasteners for Wall Panels: 300 series stainless steel with 5/8-inch bonded neoprene or EPDM and stainless washers.
 - 2. Concealed fasteners to be cadmium plated carbon steel.
- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.4 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Metal Panel: Uninsulated 7/8 inch in depth with 12 inches in coverage width; exterior surface to have a corrugated face.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide DS59 Corrugated by Centria or comparable product by one of the following:
 - a. Morin.
 - b. Metl-Span.
 - 2. Material: .050 inch thick aluminum.
- C. Type M-1 Flush-joint profile with half raised and half flush flat pan, 1 1/2 inch in depth and 12 inch coverage.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide IW 20A by Centria or comparable product by one of the following:
 - a. Morin.
 - b. Metl-Span.
 - 2. Material: .040 inch thick aluminum.
 - a. Exterior Facing Finish: 2-coat fluoropolymer.
 - 1) Color Custom to match Architect's sample.
 - b. Interior Facing Finish: Manufacturer's standard siliconized polyester where unexposed; match exterior facing finish where exposed (equipment screen).
- D. Type M-2 Flush-joint profile with raised flat pan, 1 1/2 inch in depth and 12 inch coverage.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide IW 10A by Centria or comparable product by one of the following:
 - a. Morin.
 - b. Metl-Span.
 - 2. Material: .040 inch thick aluminum.
 - a. Exterior Facing Finish: 2-coat fluoropolymer.
 - 1) Color Custom to match Architect's sample.
 - b. Interior Facing Finish: Manufacturer's standard siliconized polyester where unexposed; match exterior facing finish where exposed (equipment screen).

- E. Type M-3 Alternating Panels of two types consisting of one flush-joint profile with raised flat pan and a panel with a one inch reveal joint with raised flat pan, 1 1/2 inch in depth and 12 inch coverage.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide IW-40A and IW 10A by Centria or comparable product by one of the following:
 - a. Morin.
 - b. Metl-Span.
 - 2. Material: .040 inch thick aluminum.
 - a. Exterior Facing Finish: 2-coat fluoropolymer.
 - 1) Color Custom to match Architect's sample.
 - b. Interior Facing Finish: Manufacturer's standard siliconized polyester where unexposed; match exterior facing finish where exposed (equipment screen).
- F. Type M-4 Flush-joint profile with raised flat pan with single centered stiffner bead, 1 1/2 inch in depth and 12 inch coverage.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide IW 14A by Centria or comparable product by one of the following:
 - a. Morin.
 - b. Metl-Span.
 - 2. Material: .040 inch thick aluminum.
 - a. Exterior Facing Finish: 2-coat fluoropolymer.
 - 1) Color Custom to match Architect's sample.
 - b. Interior Facing Finish: Manufacturer's standard siliconized polyester where unexposed; match exterior facing finish where exposed (equipment screen).

2.5 ACCESSORIES

- A. Provide components required for a complete metal wall panel assembly including trim, copings, fascia, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.
 - Trimless End Closures: Provide trimless metal panel closures at the ends of all insulated metal wall panels. On flat panels the metal closure will extend a minimum of one inch from the face of the panel. Metal panel closures will allow for trimless condition at vertical panel joints. Formed trims and extrusions will not be acceptable at vertical joint conditions.

2.6 FABRICATION

- A. General: Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
 - 1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
 - 2. Fabricate wall panels with panel stiffeners as required to maintain fabrication tolerances and to withstand design loads.
- B. Provide factory-fabricated mitered corners; field cut and joined corners will not be accepted.
 - 1. Mitered corner assemblies shall match specified exterior profile panel in shape, general appearance, material and finish.

- 2. Mitered corner assemblies shall be factory coil coated to match adjacent panels; paint finish shall meet specified warranty requirements.
- C. Fabricate metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 3. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of work.
 - 1. Examine primary and secondary wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 - 2. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - 3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to ASTM C 754 and metal wall panel manufacturer's written recommendations.

3.3 METAL WALL PANEL INSTALLATION, GENERAL

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

- 1. Commence metal wall panel installation and install minimum of 300 sq. ft. in presence of factory-authorized representative.
- 2. Field cutting of metal wall panels by torch is not permitted.
- 3. Shim or otherwise plumb substrates receiving metal wall panels.
- 4. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction.
- 5. Flash and seal metal wall panels with weather closures at eaves and at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until weather barrier and flashings that will be concealed by metal wall panels are installed.
- 6. Install screw fasteners in predrilled holes.
- 7. Locate and space fastenings in uniform vertical and horizontal alignment.
- 8. Install flashing and trim as metal wall panel work proceeds.
- 9. Provide panel splices with structural support behind each joint. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
- 10. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as necessary for waterproofing.
- 11. Align bottom of metal wall panels and fasten with fasteners as recommended by the metal wall panel manufacturer. Fasten flashings and trim around openings and similar elements with fasteners as recommended by the metal wall panel manufacturer.
- 12. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
- B. Fasteners: Stainless steel.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal wall panel manufacturer.
- D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.
 - 1. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealers."
 - 2. Seal noninsulated metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.

3.4 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form

- hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
- 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal wall panel units within installed tolerance of 1/4 inch in 20 feet, nonaccumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

- A. Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Water-Spray Test: After completing the installation of 75-foot length by full height area of metal wall panel assembly, test assembly for water penetration according to AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal wall panel installation, including accessories. Report results in writing.
- D. Remove and replace applications of metal wall panels where inspections indicate that they do not comply with specified requirements.
- E. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain in a clean condition during construction.
- B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

SECTION 07 42 15 - PERFORATED METAL PLATE WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Perforated aluminum metal plate wall panels.

1.2 RELATED REQUIREMENTS

- A. Section 05 40 00 Cold-Formed Metal Framing: Wall panel substrates support framing.
- B. Section 06 10 00 Rough Carpentry: Plywood substrate wall sheathing.
- C. Section 07 62 00 Sheet Metal Flashing and Trim: Field formed flashings and other sheet metal work.
- D. Section 07 90 05 Joint Sealants: Perimeter sealant.

1.3 DEFINITIONS

A. Metal Plate Wall Panel Assembly: Metal plate wall panels, attachment system components, miscellaneous metal framing and accessories.

1.4 REFERENCE STANDARDS

- A. AAMA American Architectural Manufacturers Association (www.aamanet.org)
 - 1. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum; 14(Errata 2015)
 - 2. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 13(Errata 2014) [Testing based on 2005 Edition]
- B. ASTM International (American Society for Testing and Materials; www.astm.org)
 - 1. ASTM B69 Standard Specification for Rolled Zinc; 2013
 - 2. ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus; 2011
 - 3. ASTM C754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products http://www.astm.org/Standards/C754.htm; 2015
 - 4. ASTM D523 Standard Test Method for Specular Gloss; 2014
 - 5. ASTM D2244 Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2015
 - ASTM D2247 Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2011
 - 7. ASTM D4214 Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 07(2015)
- C. LEED Leadership in Energy and Environmental Design
- D. NAAMM National Association of Architectural Metal Manufacturers
- E. SMACNA Sheet Metal and Air Conditioning Contractor's National Association
- F. PS Voluntary Product Standard; National Institute of Standards and Technology (NIST)
 - 1. PS-1 Structural Plywood; 2009

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate panel assemblies with rain drainage, flashing, trim, stud back-up, soffits, and other adjoining work.

B. Preinstallation Meeting:

- Attendees:
 - a. Owner.
 - b. Architect.
 - c. Installer.
 - d. Panel manufacturer's representative.
 - e. Structural support installer.
 - f. Installer's whose work interfaces with or affects wall panels including installers of doors, windows, and louvers.
- 2. Review and finalize construction schedule.
- 3. Verify availability of materials, installer's personnel, equipment, and facilities needed to maintain schedule.
- 4. Review means and methods related to installation, including manufacturer's written instructions.
- 5. Examine support conditions for compliance with requirements, including alignment and attachment to structural members.
- 6. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affects this Work.
- 7. Review temporary protection requirements for during and after installation of this Work.

1.6 SUBMITTALS

- A. See Section 01 3000 Administrative Requirements, for submittal procedures.
- B. Product Data: Submit for each type of product indicated, include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal plate wall panel and accessory.
- C. Shop Drawings: Submit fabrication and installation layouts of metal plate wall panels; including details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 1. Provide distinction between factory-assembled, shop-assembled, and field-assembled work.
 - 2. Provide details of following items at full scale.
 - a. Manufacturer's standard sheet metal trims.
 - b. Components of wall panel construction, anchorage methods, and hardware.
- D. Coordination Drawings: Submit exterior elevations, drawn to scale, that have the following items shown and coordinated with each other, using input from installers of these items as follows:
 - 1. Metal plate wall panels and attachments.
 - 2. Girts.
 - 3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
 - 4. Penetrations of wall by pipes and utilities.
- E. Samples: Submit for each type of exposed finish required, and prepared on samples of size indicated below:
 - 1. Aluminum Metal Plate Wall Panels: At least 2 inch by 3 inch.
- F. Test and Inspection Reports: Submit test and inspection reports on each type of wall panel system provided for project based on evaluation of comprehensive tests performed by qualified testing agency.
- G. Maintenance Data: Submit maintenance data for metal plate wall panels.

- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- I. Sustainable Design Submittals:
 - 1. Submit documentation from manufacturer for amounts of pre-consumer and post-consumer recycled content for products specified, and include statement indicating costs for materials having recycled content.
 - 2. Submit documentation providing location of manufacturing.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with at least five years of documented experience.
- B. Installer: Company specializing in performing work of this section and approved by manufacturer.
 - 1. Install system in strict compliance with manufacturer's installation instructions.
- C. Anodized Finish Applicator: Provide either caustic (traditional) or eco-friendly (acid) etching technologies.
 - 1. Use fully automated, computer-controlled process lines for consistency of finish throughout project.
 - 2. Use documented production line quality control protocols in accordance with AAMA 611 test procedures.
- D. Source Limitations: Obtain each type of metal plate wall panel from single source and from single manufacturer.

1.8 MOCKUPS

- A. Mockups: Provide mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and to establish quality standards for fabrication and installation.
 - 1. Build mockup of typical wall panel assembly as shown on Drawings, including corner, supports, attachments, and accessories.
 - a. Include at least four panels to represent a four-way panel joint and showing full thickness.
 - 2. Approval of mockups does not constitute approval of deviation from Contract Documents within mockups unless these deviations are approved by Architect in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of completed Work if undisturbed upon Date of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling: Store materials in clean, dry, interior area in accordance with manufacturer's instructions.
- C. Deliver panels, components, and other manufactured items without damage or deformation.
- D. Protect panels during transportation, handling, and installation from weather, excessive temperatures and construction operations.
- E. Handle panels in strict compliance with manufacturer's instructions and recommendations, and in a manner to prevent bending, warping, twisting, and surface damage.

- 1. Store panels vertically with top of panel down, storage of panels horizontally is not permitted.
- F. Store panels covered with suitable weather tight and ventilated covering.
- G. Provide storage of panels to ensure dryness, with positive slope for drainage of moisture.
- H. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
- I. Remove strippable protective covering from aluminum panel prior to installation.

1.10 SITE CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work to be performed according to manufacturer's installation instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before panel fabrication and indicate measurements on Shop Drawings.
 - 1. Coordinate with construction schedule.

1.11 WARRANTY

- A. See Section 01 7800 Closeout Submittals, for additional warranty requirements.
- B. Wall System Warranty: Provide wall panel manufacturer warranty, agreeing to correct defects in manufacturing of materials within a one year period after Date of Substantial Completion.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration: Beyond normal weathering of wall system metals and other materials.
- C. Panel Finish Warranty: Provide panel finish manufacturer warranty, agreeing to repair finish of metal plate wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: [5] years from Date of Substantial Completion.
 - 2. Warranty Coverage: In accordance with AAMA 2605 for 70 percent PVDF resin on aluminum finish requirements.
 - a. Fading, Loss of Color Retention: Loss of 5 Delta E units (Hunter) or less in accordance with ASTM D2244.
 - b. Chalking, Chalky White Powder on Panel Surface: Chalking at No. 8 or less for colors or No. 6 for white in accordance with ASTM D4214.
 - c. Loss of Adhesion: Loss of 10 percent due to cracking, checking or peeling, or failure to adhere to bare metal.
 - d. Gloss Retention: 50 percent or less in accordance with ASTM D523.
 - e. Salt Spray, Accelerated: At least 4,000 hours in accordance with ASTM B117.
 - f. Humidity Testing, Accelerated: At least 4,000 hours in accordance with ASTM D2247
 - 3. Warranty Coverage: In accordance with AAMA 611 Class 1 anodized aluminum finish requirements.
 - a. Loss of Adhesion: Resists cracking, crazing, flaking, and blistering when forming and welding completed prior to finishing; post forming or welding voids warranty.
 - b. Fading, Loss of Color Retention: Loss of 5 Delta E units (Hunter) or less in accordance with ASTM D2244.
 - c. Chalking, Chalky White Powder on Panel Surface: Chalking at No. 8 or less in accordance with ASTM D4214.

d. Salt Spray, Accelerated: At least 3,000 hours in accordance with ASTM B117.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Dri-Design Wall Panel System; Product Perforated Series
 - 1. Address: 12480 Superior Ct., Holland, Michigan 49424
 - 2. P.O. Box 1286 Holland, Michigan 49422-1286
 - 3. Phone: (616) 355-2970; Fax: (616) 355-2972; Website: www.dri-design.com
- B. Zinc Alloy Plate Material Supplier.
 - 1. Umicore Building Products; Product Architectural Zinc, VMZINC®
 - 2. Address: 3120 Highwoods Blvd.; Suite 104, Raleigh, NC 27604
 - 3. Phone: (919) 874-7173; Fax: (919) 874-7140; Website: www.vmzinc-us.com
- C. Perforated Series System: Perforated wall panel system that allows for air flow.
 - 1. Style: Flat.

2.2 PERFORMANCE REQUIREMENTS

- A. Metal Plate Wall Panel Assemblies: Comply with performance requirements without failure due to defective manufacturing, fabrication, installation, or other construction defects.
- B. Design, fabricate, and erect a dry joint, aluminum wall panel system without use of sealants, gaskets, or butyl tape

2.3 MATERIALS - ALUMINUM

- A. Aluminum Plate: Alloy and temper as recommended by manufacturer for application and in compliance with manufacturers design requirements.
 - 1. Aluminum Material: Tension-leveled, or anodized finish 5005-AQ manganese alloy.
 - 2. Thickness: 0.080 inch.
 - 3. Weight: Less than 2 lbs per sf.
 - 4. Finish: Color Anodized Finish.
- B. Panel Depth: 1-1/4 inch, nominal.
- C. Panel Size: As indicated on Drawings.
- D. Panel Joints: As indicated on Drawings.

2.4 FABRICATION

- A. Fabricate and finish wall panels within manufacturer's facilities and fulfill indicated performance requirements demonstrated by laboratory testing.
 - 1. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide post-finishing of panels, paint aluminum wall panels only after completion of panel fabrication and ensure exposed edges are coated.
- C. Provide post anodizing of panels, anodize aluminum wall panels only after completion of panel fabrication and ensure exposed edges are anodic coated without crazing of surface at formed edges.

2.5 FINISHES

- A. Comply with NAAMM's Metal Finishes Manual for Architectural and Metal Products, for recommendations of designating finishes.
- B. Field Touch-Up Materials: As recommended by coating manufacturer for field application.

2.6 FINISHES - ALUMINUM

- A. Comply with NAAMM's Metal Finishes Manual for Architectural and Metal Products, for recommendations of designating finishes.
- B. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) resin system.
 - 1. Two-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' installation instructions.
 - 2. Three-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' installation instructions.
 - 3. Two-Coat Mica Fluoropolymer: AAMA 2605, fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' installation instructions.
 - 4. Four-Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat and clear coats. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' installation instructions.
- C. Color Anodized Finish: AAMA 611, Architectural Class I, color anodized coating of 0.0007 inch (0.7 mils) minimum thickness.
 - 1. Color: To be selected by architect from manufacturer's standard range of available colors.
- D. Clear Anodized Finish: AAMA 611, Architectural Class I, clear anodized coating of 0.0007 inch (0.7 mils) minimum thickness.
- E. Field Touch-Up Materials: As recommended by coating manufacturer for field application.

2.7 ACCESSORIES

- A. Metal Plate Wall Panel Accessories: Provide components required for a complete metal plate wall panel assembly including trim, copings, fascia, mullions, sills, corner units, flashings, and similar items. Match material and finish of panels unless otherwise indicated.
- B. Provide integral drainage system and manufactures standard extrusions at termination of dissimilar materials.
- C. Flashing and Trim: Match material, finish, and color of adjacent wall panels.
 - 1. Thickness: At least 0.040 inch.
 - 2. Refer to Section 07 6200.
- D. Panel Fasteners: Designed to withstand design loads, with at least 7/16 inch diameter head and neoprene washer.
 - 1. Aluminum Wall Panel Material: Provide stainless steel fasteners, or coated fastener approved by panel manufacturer or project wall consultant.
- E. Sub-Girts: Galvanized, provide size and gage in accordance with project requirements.
 - 1. Furring Channel: Provide Hat, C, U or Z type as recommended by manufacturer.
 - 2. Flat Strap: At least 14 gage, 0.0747 inch (1.90 mm) thick.
 - 3. Refer to Section 05 4000.

- F. Substrate Wall Sheathing: Plywood, PS-1, Grade C-D, Exposure I, at least 5/8 inch thick.
 - 1. Refer to Drawings and Section 06 1000 for requirements.
- G. Weather Barriers: Provide climate specific weather barrier with performance characteristics for air penetration, water vapor transmission, and water penetration resistance.
 - 1. Refer to Section 07 2500 for requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, and Work areas and conditions with Installer present for compliance with requirements for installation tolerances, wall panel supports, and other conditions affecting performance of this Work.
- B. Examine wall framing to verify that girts, angles, channels, studs, and other structural wall panel support members and anchorage have been installed within alignment tolerances required by wall panel manufacturer.
- C. Verify that weather barrier has been installed over sheathing or substrate to prevent air infiltration or water penetration.
- D. Examine rough-in for components and systems penetrating wall panels to coordinate actual penetration locations relative to wall panel joint locations prior to installation.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Framing: Install sub girt, base angles, sills, furring, and other wall panel support members and provide anchorage in accordance with ASTM C754 for gypsum panel type substrates and panel manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install wall panels in accordance with manufacturer's installation instructions, including pressure equalized rainscreen installation method and installation guidelines.
 - 1. Wall panels consist of single sheets of metal formed with interlocking gutter and drainage system integral to the panel with single horizontal attachment for dry-joint rainscreen assembly.
 - 2. Use of secondary drainage channels, brackets, support pins, joint sealants or gaskets to manage the drainage of wall panel system is not permitted.
 - 3. Attach wall panels using progressive interlocking method, engaging bottom of panel in top of previous panel working bottom up, and left to right.
 - 4. Install wall panels with single top attachment in pre-punched holes to allow individual panels to move due to thermal expansion.
 - 5. Do not compromise internal gutter.
 - 6. Installers shall wear gloves and long sleeve shirts to prevent oils on fingers and skin from leaving marks on zinc alloy surfaces.
 - a. Use mineral oil approved by zinc alloy supplier to remove finger prints.
 - 7. To limit damage due to galvanic action on metal panels from water flowing over surfaces, install metals in the following order from top to bottom; aluminum, zinc, galvalume, lead, and copper.
- B. Install wall panels for orientation, sizes, and locations as indicated on Drawings.

- C. Install wall panels with proper anchorage and other components for this Work securely in place.
- D. Install wall panels with provisions for thermal and structural movement.
- E. Install shims to plumb substrates as necessary for installation of wall panels.
- F. Install weather tight seals at perimeter of wall panel openings.
 - 1. Test for proper adhesion on small unexposed area of solid surfacing prior to use.
 - 2. Refer to Section 07 90 05.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA Architectural Sheet Metal Manual.
 - 1. Provide concealed fasteners where possible, and set units true to line and level as indicated.
 - 2. Install work with laps, joints, and seams that will be permanently watertight and weather resistant
 - 3. Install flashing and trim as wall panel Work proceeds.
- H. Install weather tight escutcheons for pipe and conduit penetrating exterior walls.
- I. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by wall panel manufacturer.
- J. Install attachment system to support wall panels and with provisions to provide a complete weather tight wall system, including sub girts, extrusions, flashings and trim.
 - 1. Include attachment to supports and trims at locations using dissimilar materials.
 - 2. Do not apply sealants to joints, unless noted otherwise on Drawings or Shop Drawings.
 - 3. Install starter extrusion at base course and at cut panel locations.
- K. Install accessories with positive anchorage to building and weather tight mounting and provisions for thermal expansion, and coordinate installation with flashings and other components.
 - 1. Install components required for a complete wall panel assembly including trim, copings, flashings and other accessory items.
- L. Weather Barrier: Install weather barrier behind wall panels and over substrate in accordance with requirements of Section 07 2500.

3.4 TOLERANCES

A. Shim and align wall panel units with installed tolerances of 1/4 inch in 20 feet, non-cumulative, on level, plumb, and location lines as indicated.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing agency to perform field tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.
- C. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.
- D. Perform additional tests and inspections, at Contractor's expense, to verify compliance of replaced wall panels or necessary additional work with specified requirements.
- E. Prepare test and inspection reports.

3.6 CLEANING

- A. Upon completion of wall panel installation, clean finished surfaces as recommended by panel manufacturer.
- B. Clean zinc surfaces of fingerprints immediately with wall panel manufacturer approved mineral oil.
- C. Upon completion of wall panel installation, clear weep holes and drainage channels of obstructions and dirt.

3.7 PROTECTION

- A. Protect installed products from damage during subsequent construction.
- B. Replace wall panels damaged or deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 50 56 - VEGETATED ROOFING SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes an adhered thermoplastic membrane waterproofing system with integral flashings the following:
 - 1. Extensive Vegetated Roof Assembly.
 - a. Mechanically attached base layer and adhered tapered polyisocyanurate insulation.
 - b. Fully-adhered thermoplastic membrane applied to cover board and parapet walls, refer to Section 07 54 16.
 - c. Protection/drainage mat.
 - d. Molded plastic water retention and drainage layer.
 - e. Engineered Soil and pre-planted vegetated mats plus 30 percent aceent grasses and tall plants.
 - f. Roof Paver system.
 - g. Single Source Full System Warranty.

1.2 DEFINITIONS

- A. Vegetated Roof: An area of planting and landscape, built up on a waterproofed substrate at any level that is separated from the natural ground by a man-made structure.
- B. Vegetated Roof System: The complete system of materials that functions to provide a watertight protected membrane and an Extensive vegetated roof design to assist in storm water management, energy conservation and a long-term life-cycle expectation.
- C. Extensive Green Roof: Low to no maintenance landscaping consisting of shallow soil depths (<6 inches) with plant varieties that are restricted primarily to sedums, mosses, herbs and grasses that can withstand harsh conditions and are an adaptive species to the area of planting.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Roof Membrane Design: Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
- D. Flashings: Comply with requirements of Division 7 Section "Sheet Metal Flashing and Trim." Provide base flashings, perimeter flashings, detail flashings and component materials that comply with requirements and recommendations of the following:
 - 1. FMG 1-49 Loss Prevention Data Sheet for Perimeter Flashings.
 - 2. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.

E. Emergency Response Plan:

1. Any damage to the building caused by the Work, leaks or accidents must be addressed immediately by the Contractor as an emergency.

- 2. The Contractor must respond to leaks or problems at the site during construction with a repair crew within three hours of phone notification.
- 3. Provide a complete emergency telephone list for at least three responsible company representatives that will be on call during the course of the Project; include cell phone numbers, pager numbers and home phone numbers.
- 4. Designate one emergency contact in writing to Architect on a weekly basis.

1.4 SUBMITTALS

- A. Any Substitution must also comply with the LEED requirements listed for the specified item.
- B. The Contractor and their sub-contractors shall submit the LEED building certification items listed herein. LEED Building submittals shall include the following:
 - 1. A completed Environmental Building Materials Certification Form. Information to be supplied for this form shall include:
 - a. Cost breakdowns for the materials included in the contractor's or sub-contractor's work. Cost breakdowns shall include total cost plus separate labor, equipment, and material costs. A materials only cost must be identified.
 - b. The amount of post-consumer and/or post industrial recycled content in the supplied product(s).
 - c. The manufacturing location for the supplied product(s).
 - d. The location (source) of the raw materials used to manufacture the supplied product(s).
 - e. Product data for insulation installed within the building waterproofing envelope; comply with low- emitting requirements in Section 01 61 16.
 - 2. Material Safety Data Sheets, for all applicable products. If the MSDS does not show the product's VOC content, this information must be provided through other published product literature from the manufacturer, or stated in a letter of certification (on the manufacturer's letterhead) from the product manufacturer.
- C. Product Certificate: Submit notarized certificate, indicating complete list of products intended for use under Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- D. Product Data: For each type of roofing material indicated.
- E. Shop Drawings: Show locations and extent of roofing. Include plans, sections, details, and attachments to other Work, for substrate joints and cracks, flashing sheets, roof penetrations, vertical intersections, roof slope, expansion joints, and membrane terminations.
 - 1. Show locations, extent, and details of roof pavers.
- F. Submit a letter signed by the manufacturer and Contractor acknowledging that the submitted roof membrane design complies with ASCE-7 for wind speed code requirements.
- G. Samples for Verification: For each of the following products:
 - 1. 12-by-12-inch square of protection mat and drain board
 - 2. Engineered soil and plants.
 - 3. Border aggregate & roof pavers, full sized, in each color and texture required.
- H. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- I. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

- J. Qualification Data: For Installer, manufacturer, and field technical inspector per Section 1.6 "Quality Assurance".
- K. Project Closeout Reports: Provide a report upon delivery of the project warranty. This report to include:
 - 1. Project Specifications.
 - 2. Project Summary.
 - 3. Progress reports as a result of roof inspections.
 - 4. Job-site progress photos.
 - 5. Warranty document.
 - 6. Owners Manual describing maintenance and emergency repair.
- L. Maintenance Data and Training Materials: For roofing system to include in maintenance manuals and Owner's training library.
- M. Warranties: Submit specimen copy of the manufacturer's standard roofing warranty modified as required by this Section and other Contract Documents; Work cannot start prior to the Architect's review and comment on this specimen copy.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
 - 1. Installer Shall:
 - a. Submit an affidavit attesting that Contractor has in place and fully implemented a written Health, Safety and Environmental Plan and the plan is compliant with all applicable Federal, State and Local regulations.
 - b. Be a Manufacturer Approved/Certified Contractor experienced with the specified roof system. And, shall obtain written certification from the manufacturer certifying that installer is approved by manufacturer for installation of the specified roofing system.
 - c. Provide installer's field supervision. Installer must maintain full-time supervisor/foreman on job-site during times that roofing work is in progress. Supervisor must have a minimum of 5 years experience in roofing work similar to nature and scope of specified roofing.

B. Protection of Installed Materials

- 1. Against Loads: Protect existing structure and work of this section against concentrated loads and any other loads or equipment that would cause damage. Use boards or other approved means to safely distribute the loads.
- Against Traffic: Do not permit traffic on areas of this section except for workmen doing
 the work during installation, until covered with protective boards or with specified finish
 materials. Take necessary preventative measures to protect work of the section from
 damage during and after application, until traffic is permitted.
- 3. Rejection of Damaged Work
 - a. Damaged materials or work will be rejected.
 - b. Rejected materials or work must be immediately removed and replaced with new materials at the contractor's expense.
- C. Conform to roofing membrane manufacturer's instructions.
- D. Source Limitations:

- 1. Obtain roof system components through sources acceptable to roofing manufacturer providing total system warranty. Provide a letter, on the roofing manufacturer's letterhead and signed by representative of the roofing manufacturer, accepting the products selected by the installer.
- 2. The roofing manufacturer shall provid the total system warranty for the work of this section must also be the manufacturer providing the system required under Section 07 54 16
- E. Project Meetings: Comply with requirements for pre-installation conferences in Division 1 Section "Project Management and Coordination."
 - 1. Pre-Construction Conference
 - a. General: Before starting roof deck construction or re-roof preparation, conduct conference at Project site. Comply with requirements for pre-installation conferences in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roof deck construction or re-roof preparation and roofing system as follows:
 - Will be scheduled by the Architect/Owner's Representative after notice of award.
 - 2) Attendance: Architect/Owner's Representative, General Contractor, Manufacturer/warranty issuer, and Third Party Inspectors (if required).
 - 3) Minimum agenda: Submittal list of subcontractors, materials and progress schedule. Designation of responsible personnel. Walkover inspection. Review of the building and grounds; review the scope of work; review manufacturers installation standards and review of the environmental and atmospheric plan.
 - 2. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
 - a. Participants: Authorized representatives of the Owner, Construction Manager, Architect, Consultant, General Contractor, Roofing Subcontractor, Roofing Manufacturer, and installers of roof components/accessories and roof-mounted equipment shall attend the pre-installation meeting.
 - b. Review methods and procedures related to roofing installation, including manufacturer's written installation instructions.
 - c. Review construction schedule and confirm availability of Products, Subcontractor personnel, equipment and facilities.
 - d. Review deck installation criteria and finishes for conformance with roofing system criteria, including issues of flatness and fastening.
 - e. Review structural loading conditions and limitations of roof deck both during and after roofing application.
 - f. Review flashing details, special roofing details, roof drainage, roof penetrations, equipment curbs, and other conditions affecting roofing installation.
 - g. Review field quality control procedures.
 - 3. Progress Meetings
 - a. General: Review methods and procedures related to roofing system as follows:
 - 1) Will be scheduled by the General Contractor.
 - 2) Attendance: Architect/Owner's Representative, Consultants, General Contractor, Roof Sub-contractor, Manufacturer, Third Party Inspector (if required).

3) Minimum agenda: Review of work progress. Maintenance of progress schedule. Maintenance of quality and work standards. Review of the building and grounds. Review of the scope of work.

4. Final Inspection

- a. General: Review methods and procedures related to roofing system as follows:
 - 1) Will be scheduled by General Contractor upon completion.
 - 2) Attendance: Architect/Owner's Representative, Consultants, General Contractor, Roof Sub-contractor, Manufacturer, Third Party Inspector (if required).
 - 3) Minimum agenda: Walkover inspection. Identification of problems, which may impede issuance of warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Refer to manufacturer recommendations.
- B. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.
- C. Storage of Materials
 - Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - a. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
 - 2. Store materials marked "keep from freezing" in areas where temperatures will remain above 40 degrees Fahrenheit.
 - 3. Rooftop storage: Disperse material to avoid concentrated loading.
 - 4. Contractor is responsible for the safekeeping of materials stored onsite.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.7 WARRANTY

- A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Upon project completion, Manufacturer acceptance, and once complete payment has been received; the contractor shall deliver to the Owner a twenty (20) year Quality Assurance Total System Warranty and Owner's Manual.
 - 1. Vegetated Roof System Complete Assembly Warranty:
 - a. System Warranty: covers components of the green roof assembly, including membrane, flashings, root barrier, protection mat, drain board, insulation, and termination details.
 - 1) Duration of membrane/flashing: 20 year (watertight condition)
 - (a) Wind speeds not to exceed 90 mph.
 - b. Plant Establishment Warranty on growing media and plantings are covered separately under the terms of the warranty agreement, if purchased from the Warrantor. The Warrantor will not warrant growing media and plant materials not purchased through the Warrantor.

- 1) Extensive type plantings
 - (a) Duration of Warranty: 3 years.
 - (b) The Warrantor guarantees that sedum plantings selected, approved and provided by the Warrantor or its certified representatives will propagate from the initial planting, and plantings will be alive, growing and cover the planted roof area at an approximate minimum rate of: 80% coverage after 18 months; and 80% coverage after three full years.
- c. Inspections, Preventative Roof Maintenance and Establishment:
 - 1) Plant and Growing Media establishment services are as follows:
 - (a) Removal of all plantings that have not successfully established, conducted twice annually each of the first three years. All debris will be disposed of at the Owner's approved on-site location. Debris left by other trades or the owner(s) is not included.
 - (b) Weeding of invasive plant species will be conducted twice annually, each of the first three years. Additional weeding desired by the owner will be at an additional per trip cost.
 - (c) Fertilizer, if required, will be completed once per year.
 - (d) Replacement of dead plant material, as required, to meet the prescribed coverage rates will be included. Plant materials destroyed through acts of negligence, owner modifications, wind events greater than 50mph or other acts of God, are not covered.
 - (e) Compaction of growing media is not covered under the terms of the establishment agreement. To avoid this problem, an additional 15% of the designed minimal soil volume should be specified and placed during original construction. If compaction occurs and the owner desires additional placement of material, this will be provided on an additional cost basis.
 - (f) Regular inspection reports issued via email to Architect and Owner at each bi-annual visit. Reports should include before and after photos, explanation of maintenance provided at each visit.
- d. The Warrantor shall provide roof inspection reports based upon regular inspections as defined above.
- e. Warranty Exclusions:
 - 1) Natural or accidental disasters including, but not limited to, damage caused by lightning, hailstorms, floods, hurricane force winds (74 mph or greater), tornadoes, earthquakes, fire, vandalism, animals, penetration of the membrane, or chemical attack by outside agents.
 - 2) Use of materials not specified by the Warrantor.
 - 3) Overburden materials of any type installed after warranty issue are not covered and will be the responsibility of the owner, in the event they must be removed to identify leak sources and effect repairs. Deck materials built over the vegetative roof are not covered. Poured concrete pavers are not covered. Overburden materials include soil, vegetation, drain board, water retention boards or mats, root barrier materials, metal edging, pavers, gravel or aggregate surfaces.
 - 4) Any intentional or negligent act on the part of the Owner or third party including, but not limited to, misuse, traffic, storage of or discharge of materials or effluent on the roof. Any repair of these items will be at Owner's expense.

- 5) Distortion, expansion or contraction of the vegetated roof system caused by faulty original construction or design of building components, including parapet walls, copings, chimneys, skylights, vents or roof deck.
- 2. All roof sections on this Project, including TPO roofing, to be warranted by one manufacturer.

PART 2 PRODUCTS

2.1 ELECTRIC FIELD VECTOR MAPPING SYSTEM

- A. General: Provide a leak detection system that delivers a pulsating low voltage potential difference between the roof surface and the structural deck. The system is designed to detect a breach in the roof membrane system by detecting an electrical connection.
 - 1. The wire component of the system shall remain on the roof membrane and buried in the system, so that future leak detection tests are possible.
 - 2. Basis of Design product, International Leak Detection.

2.2 FABRIC PROTECTION MAT FOR ROOF MEMBRANE

A. Fabric Protection Mat: Basis of Design Product, Polymat VR; Woven or non-woven polypropylene, polyolefin, or polyester fabric mat; water permeable and resistant to UV-light degradation; of type and weight recommended by insulation manufacturer for application.

2.3 PROTECTION AND DRAINAGE LAYER

- A. Pre-fabricated Drainage Course: Basis of Design Product; Tremco WaterDrain VR 1"; A composite drainage system consisting of high compressive strength polystyrene plastic core laminated between 2 geotextile fabrics for use with extensive and semi-intensive designs of soil depths up to 18 inches.
 - 1. Water Retention Capacity; 0.11 gal/sf
 - 2. Flow Rate @ gradient = 1.0; 100 gpm/sf width per ASTM D 4716
 - 3. Flow Rate @ gradient = 0.1; 21 gpm/sf
 - 4. Drainage Layer Thickness; 1 inch
 - 5. Compressive Strength; 9,500 lbs/sf, per ASTM D 1621

B. Accessories:

- 1. Drain Access Box; aluminum housing with removable ventilated top and flange base. Access opening: 12" by 12"; Flange: 18" by 18"; Height: 5".
- 2. Metal Edge Restraint; 1/8" aluminum "L" shape with slotted openings for water drainage.
 - a. Vertical leg to be a minimum of 1 inch taller than planting media.
 - b. Horizontal leg to be a minimum of 4 inches wide.
- 3. Adhesive tape for fabric joints; Basis of Design product, Tremco Para JT Tape.

2.4 GROWING MEDIA

- A. Reference ASTM E 2396-05 and ASTM E 2399-05 for design standards, and must be FLL compliant.
- B. Basis of Design product: SkyGarden M2 Extensive Blend Growing Media or equal.
 - 1. Mix specifically designed to meet project requirements based on climactic region and plant requirements.
 - 2. Components of the growing media mix are to be blended with equipment intended for that purpose; front end loader bucket blending or pad blending are not permitted.

2.5 PRE-PLANTED VEGETATED MATS

- A. Composition from top down:
 - 1. Vegitation: Reference Sedum Plantings.
 - a. Mats to be a minium of 90 percent vegetated at time of placement on roof.
 - 2. Soil Medium in Mat: 1" deep, 70 percent expanded shale aggregate, 10 percent organic composted material and 20 percent USDA sand.
 - 3. Top Net: Polypropylene, 8.0 lbs/1,000 sq.ft.
 - 4. Center net: Polypropylene, corrugated, 24.0 lbs/1,000 sq.ft.
 - 5. Cocunut Fiber: 0.50 lbs/sq.yd.
 - 6. Bottom Net: Polypropylene, 8.0 lbs/1,000 sq.ft.

2.6 SEDUM AND ACCENT GRASS PLANTINGS

- A. Reference ASTM E 2400-06 for design standards.
- B. In addition to the sedums listed provide 30% coverage of accent grasses and taller plants.
- C. The selection of the plants will be done with sedum varieties accepted by the warrantor. The species will be in accordance with the known varieties that have been successfully incorporated into extensive roof design for the particular plant hardiness zone of the specified project. Plant selection that varies from the plant species recommended by the warrantor will not be warranted in any fashion.
 - 1. Green roof plants that are nursery grown with-in 100 miles of project and by a nursery specifically engaged in the propagation of green roof plants.
 - 2. Plants to be supplied in fully vegetated biotrays.
 - 3. Plants to be installed at random pattern to resemble a meadow.
 - 4. The design shall require 85% coverage after three growing seasons.
 - 5. Species: Provide the following species in the ratios indicated (ie. for every 1 Allium schoenoprasum, provide 1 Talinum calycinum, 2 Sedum sexangulare, etc.).
 - a. 4 Sedum floriferum/ S. floriferum 'Weihenstefaner Gold'
 - b. 4 Sedum kamtschaticum
 - c. 4 Sedum rupestre 'Angelina'
 - d. 3 Sedum spurium 'John Creech'
 - e. 3 Sedum spurium 'Fuldeglut' or S. spurium 'Schorbuser Blut'
 - f. 2 Sedum spurium 'Roseum'
 - g. 2 Sedum album
 - h. 2 Sedum sexangulare
 - i. 1 Talinum calycinum (freely self-sowing)
 - j. 1 Allium schoenoprasum (self-sowing)
- D. Wind Erosion Control: As recommended for use with specified system by vegetative roofing system manufacturer.

2.7 AGGREGATE BALLAST

- A. Aggregate Ballast: Washed, crushed stone or smooth stone that will withstand weather exposure without significant deterioration and will not contribute to membrane degradation, of the following size:
 - 1. Size: ASTM D 448, Size 2, ranging in size from 1-1/2 to 2-1/2 inches.

2.8 ROOF PAVERS

- A. Roof Pavers: Heavyweight, hydraulically pressed, concrete units, square edged, factory cast for use as roof pavers; absorption not greater than 5 percent, ASTM C 140; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance, ASTM C 67; and as follows:
 - 1. Size: 24 by 24 inches. Manufacture pavers to dimensional tolerances of plus or minus 1/16 inch in length, height, and thickness.
 - 2. Compressive Strength: 7500 psi, minimum; ASTM C 140.
 - 3. Colors and Textures: Match Architect's samples.
 - 4. Paver Supports: Integral corner pedestals.
 - 5. Paver Supports: Paver manufacturer's standard SBR rubber, high-density polyethylene, or polyurethane paver support assembly, including adjustable or stackable pedestals, shims, and spacer tabs for joint spacing of 1/8 to 3/16 inch.
 - 6. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Oldcastle Precast; Westile
 - b. Hanover Architectural Products, Inc.
 - c. Sunny Brook Pressed Concrete Co.
 - d. Wausau Tile, Inc.; Terra-Paving Div.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements and other conditions affecting performance.
 - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 VERIFICATION OF MEMBRANE INTEGRITY

- A. General: After installing roof horizontal membrane and before placing overburden, verify installed membrane is waterproof. Provide testing to verify membrane is free of any holes, open seams and capillary defects that will allow water to penetrate the building envelope.
 - 1. Contractor to have mechanics on site during test to immeadiately repair any breaches in the membrane.
 - 2. When waterproofing membrane is determined to be watertight, immeadiately install the protection/drainage mat.
 - 3. Utilize electrical conduction method EFVM (Electric Field Vector Mapping) as designed by International Leak Detection as follows:

- a. Installation of EFVM impulse conductor wire around perimeter of area to be tested. The testing agency will determine the size and shape of the areas. Areas will typically range between 2000sf and 7500sf. The conductor wire will consist of braided polyethylene (1.5 mm in diameter) interwoven with a minimum of 9 strands of stainless steel wire. The conductor wire will have a tensile strength of not less than 180 lbs.
- b. Place conductor wire 4 inches from the perimeter and secure against accidental movement or damage. Place so not to create a tripping hazard. Place wire directly on membrane
- c. Isolate all metal items contacting the membrane by placing isolation strands of conductor wire to isolate the field or by temporarily removing the metal items if possible.
- d. Isolate field of membrane from contact with grounded soil or structure contacting the membrane by placing isolation strands of conductor wire.
- e. Wet the test area with potable water sufficiently to create a continuous conducting "plate" above the membrane.
- f. Attach EFVM impulse generator to conductor wire with removable connectors and to ground or building structure creating a potential circuit. (The circuit will complete if water finds a path to ground by way of a breach in the membrane.)
- g. Deliver a 1 second long, 40 volt potential electrical pulse to the conductor wire at an average rate of one pulse every three seconds.
- h. Utilizing a EFVM potentiometer and two probes placed at the surface of the membrane, detect the presence or absence of electrical flow across the surface to the membrane.
- i. If there is no flow detected after a systematic search, then the certified inspector shall report the installed membrane in that area tested free of holes, seam and capillary defects and is therefore waterproof at that time.
- j. If there is flow detected during the search, then the certified inspector shall work to identify the source of electricity and therefore the breach in the membrane. The technician shall report to the roofing contractor immediately if possible the exact location of any defects on the installed membrane in that area tested.
- k. Defects found shall be repaired and retested.
- 1. The technician providing the EFVM test shall provide a report of each day's test results containing a written description and photograph of all defects and any corrections made and a schematic CAD drawing indicating location of stationary conductor wire and of any defects found in testing to within 1 inch of accuracy. This report shall be made in hard copy and submitted to the Architect and Owner.

3.4 WATER RETENTION AND DRAINAGE LAYER

- A. Starting at one end of roof, unroll drainage board composite out with the, retention cups up to hold water for landscaping or if under hardscape the retention cups should open down to prevent the retention of water. Snap cups together at all side and end laps.
- B. Adhesive or double sided tape can be used if needed to hold material down until installation of Growth Media. Spot glue a 2" x 2" square spaced every 4 to 6 feet.
- C. It is essential to mark the position of roof outlets before installing drain board, so they can be located easily and cut for easy access.
- D. Continue to roll to the end, cut to terminate. Follow to step E if additional drain board is needed.

- E. Additional roll may begin at this point and continue the length of the roof. Fold the fabric back over the joint and tape fabric with tape and/or adhesives as required.
- F. Install 2nd run of drain mat identical to the 1st run, placing drain core parallel to the 1st run. Drain core should butt up to each other, side by side; they do not have to interlock. Peel back enough salvage edge of top filter fabric, tucking one edge under the other and overlapping the seams.
- G. Cover all exposed edges with extra filter fabric to ensure filter continuity. Use tape to tape the seams
- H. To prevent Growth Media from getting under this seam during installation, tape edges every 3 to 4 feet with tape as optional protection if required.
- I. Additional filter fabric should be extended up the side of all metal edge restraint and terminated flush with Growth Media.
- J. Growth Media must be installed within 14 days in order to insure protection of the drain board.
- K. Access Box Installation; As drainage board is being installed and roof drains have been located, cut a 12" x 12" opening in the drainage board for the Access Box. Place Access Box directly over the roof drain. Backfill Growth Media up the sides of the Access Box.

3.5 EXTENSIVE GROWING MEDIA INSTALLATION

A. Media Mix Placement

- 1. Place Green Roof Media with approved equipment and protect all other materials form damage during installation.
 - a. Installation shall be achieved by way of pneumatic blower truck to minimize excess compaction of the growing medium.
 - b. The pneumatic blower truck shall be a custom manufactured, fully integrated, truck-mounted unit. The blower truck shall be equipped with a PLC calibrated injection system.
 - c. The unit shall be capable of uniformly applying materials and injected products at a rate greater than 0.15 cubic meters of material per minute up to a vertical limit of 150 feet. The blower truck shall also be equipped with an application hose capable of extending 300 feet from the blower truck unit. Contractor must have a minimum five (5) years proven experience in the application of using a Blower Truck.
 - d. If a blower truck is not economically available, the material may be loaded in super sacks and lifted to the roof. The contractor must take care not to overload the deck structure. On grade applications may be transported in bulk via appropriate means and methods by the contractor. Do not store material on the ground and uncovered, so as to prevent contamination of the soil mix.
- 2. Pre-settlement: Preset the media by thoroughly watering the entire planting area.
- 3. Fill settled low areas with the media and repeat the compaction and filling process until settlement ceases.

B. Protection of Soil Mixes

- 1. Contamination and Compaction
 - a. Do not deliver or place soils in frozen, wet, or muddy conditions. Material should be at or near optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698). Do not place materials in an excessively moist condition.
 - b. When stockpiled, protect soils media from absorbing excess water and from erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter site prior to compaction. If water is introduced into the

- material after stockpiling, allow material to drain or aerate to optimum compaction moisture content.
- c. In handling materials, operating tools and equipment, protect the media from compaction by laying down planking or plywood as required for protection.
- d. Pressure wash equipment prior to handling media to prevent weed seed contamination.

3.6 AGGREGATE BALLAST OR ROOF-PAVER INSTALLATION

- A. Lay ballast according to manufacturer's written instructions.
 - 1. Install strips/areas (minimum width of 18") of stone/paver ballast for walkways and maintenance paths at all roof perimeter, building walls and penetrations (including drains) to act as vegetation barriers for the flashings as well as barriers to wind and fire and where indicated on Drawings.
 - 2. Install curbs as designated to separate the soil areas from stone/ paver strip areas.
- B. Install inspection maintenance boxes and grills over drains to ensure access at top of soil level.
- C. Install paver stands on fabric protection mat. Level paver on stands or pedestals as required. Pavers shall be in an even plane with no noticeable unevenness.

3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Technical Representative: Contractor will engage a qualified manufacturer's technical representative acceptable to Owner for on-site monitoring to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion of roofing membrane and flashing.
 - 1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- C. Correct deficiencies in or remove roofing that does not comply with requirements, repair substrates, reapply roofing, and repair flashing.
 - 1. After flood tests, repair leaks and make further repairs until roofing installation is watertight.
- D. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with requirements.
- E. Maintenance Reports: Contractor to provide quarterly maintenance reports for the duration fo the maintenance warranty.

3.8 PROTECTING AND CLEANING

- A. Protect roofing according to manufacturer written recommendations to prevent damage and wear during application and remainder of construction period.
- B. Protect installed insulation from damage due to UV-light exposure, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 54 16 - ADHERED TPO SHEET ROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Adhered membrane roofing system.

1.2 RELATED SECTIONS

- A. Section 07 50 56 Vegetated Roofing System.
- B. Section 26 51 22 Photovoltaic System.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist the design uplift pressures calculated according to building code.
 - 1. Design Uplift Pressure: As required by code and manufacturers professional engineers design calculations.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Base flashings and membrane terminations.
- C. LEED Submittals: Submittals for roofing materials must include manufacturer's cut sheets or product data highlighting the Solar Reflectance Index (SRI) of the material and local/regional material for MRc5.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of meeting performance requirements.
- F. Qualification Data: For Installer and manufacturer.

- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- H. Research/Evaluation Reports: For components of membrane roofing system.
- I. Maintenance Data: For roofing system to include in maintenance manuals.
- J. Warranties: Special warranties specified in this Section.
- K. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
 - 1. Provide qualifications of manufacturer's field representative, as required under Field Quality Control.
 - 2. Indicate procedures followed, ambient temperatures and wind velocity during application.

L. Professional Engineers Certification:

- 1. System manufacturer shall supply Contractor signed and sealed ASCE 7-10 Design Velocity Pressure Calculation for Project with complimentary roof plan delineating field, perimeter and corner area dimensions.
- 2. System manufacturer shall also provide signed and sealed written certificate from a Professional Engineer verifying that manufacturers system meets and/or exceeds the Design Velocity Pressure Calculation for all areas of the roof. NOTE: submit roof plan with exact system attachment and assembly per each area.

M. Emergency Response Plan:

- 1. Any damage to the building caused by the Work, leaks or accidents must be addressed immediately by the Contractor as an emergency.
- 2. The Contractor must respond to leaks or problems at the site during construction with a repair crew within three hours of phone notification.
- 3. Provide a complete emergency telephone list for at least three responsible company representatives that will be on call during the course of the Project; include cell phone numbers, pager numbers and home phone numbers.
- 4. Designate one emergency contact in writing to Owner on a weekly basis.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
 - 1. Installer's Field Supervision: Maintain a full-time supervisor/foreman on job site during all phases of sheet roofing work and at any time roofing work is in progress; proper supervision of workmen must be maintained. A copy of the specification, pertinent details, and manufacturer's instructions to be in the possession of the supervisor/foreman and on the roof at all times.
- B. Manufacturer Qualifications: A qualified manufacturer that has UL listing for membrane roofing system identical to that used for this Project.
 - 1. Provide a factory trained technician for participation in the pre-installation conference, weekly and final inspection of the roofing system.
 - 2. Provide a warranty upon satisfactory installation of the roofing system.
- C. Single Source Limitations: Obtain components for membrane roofing system from a single roofing membrane manufacturer.
- D. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test

method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

- 1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
- 2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.
- E. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Comply with requirements for preinstallation conferences in Division 1 Section "Administrative Requirements." Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 7. Review governing regulations and requirements for insurance and certificates if applicable.
 - 8. Review temporary protection requirements for roofing system during and after installation.
 - 9. Review roof observation and repair procedures after roofing installation.
- F. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "Administrative Requirements." Review methods and procedures related to roofing system including, but not limited to, the following:
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review requirements of vegetated roof system.
 - 3. Review requirements of Photovoltaic Array.
 - 4. Review requirements of Electronic Field Vector Mapping system.
 - 5. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 6. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 7. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 8. Review structural loading limitations of roof deck during and after roofing.
 - 9. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

- 10. Review governing regulations and requirements for insurance and certificates if applicable.
- 11. Review temporary protection requirements for roofing system during and after installation.
- 12. Review roof observation and repair procedures after roofing installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life
- C. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period including material and labor. Failure includes roof leaks.
 - 1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, and other components of membrane roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty signed by Installer, covering Work of this Section, including all components of membrane roofing system, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: Uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced and as follows:
 - 1. Available Manufacturers:
 - a. Firestone Building Products Company. (Basis-of-Design).
 - b. Carlisle SynTec Incorporated; Sure-Weld.
 - c. Dow Roofing Systems.
 - 2. Thickness: 80 mils, nominal.
 - 3. Exposed Face Color:
 - a White

4. Physical Properties:

- a. Breaking Strength: Minimum 220 lbf; ASTM D 751, grab method.
- b. Elongation at Break: Minimum 15 percent; ASTM D 751.
- c. Tearing Strength: Minimum 55 lbf minimum; ASTM D 751, Procedure B.
- d. Brittleness Point: Minus 40 deg F.
- e. Ozone Resistance: No cracks after sample, wrapped around a 3-inch- diameter mandrel, is exposed for 166 hours to a temperature of 104 deg F and an ozone level of 100 pphm; ASTM D 1149.
- f. Resistance to Heat Aging: 90 percent minimum retention of breaking strength, elongation at break, and tearing strength after 166 hours at 240 deg F; ASTM D 573.
- g. Water Absorption: Less than 4 percent mass change after 166 hours' immersion at 158 deg F; ASTM D 471.
- h. Linear Dimension Change after aging: Plus or minus 1 percent; ASTM D 1204.

2.2 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.
- C. Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.
- D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- E. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.3 INSULATION MATERIALS

- A. General: Provide preformed, roofing insulation boards that comply with requirements, selected from manufacturer's standard sizes and of thicknesses indicated.
 - 1. Provide preformed, tapered insulation boards where indicated for sloping to drain. Fabricate with a taper of 1/4-inch per 12 inches, unless otherwise indicated.
 - a. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
 - 2. Rigid Polyisocyanurate Roof Insulation:
 - a. Qualities: Polyisocyanurate board to ASTM C1289, Type II, Class I, Grade 3; rigid, closed cell type, with specially formulated organic/inorganic facers.
 - b. Available Manufacturers:
 - 1) Firestone.
 - 2) Carlisle.
 - 3) DOW Chemical Company.
 - c. Physical Properties:
 - 1) Long Term Thermal Resistance (ASTM C518): R = 5.7 per 1 inch of thickness.
 - 2) Board Size: Manufacturers standard.
 - 3) Nominal Product Thickness: Maximum board thickness of 2.0 inches; areas of tapered insulation is an additional thickness of insulation; roof drains tapered as indicated.

- (a) Overall thickness shall be minimum required to achieve an R-Value of 30.
- 4) Compressive Strength (ASTM D1621): Minimum 25 psi (170kPa).
- 5) Density (ASTM D1622): 2 pcf.
- 6) Edges: Square.
- 7) Dimensional Stability: Less than 2 percent linear change.
- d. Provide tapered insulation as indicated on Drawings; 1/4 inch per running foot.

3. Cover Board:

- a. Project Standard: 1/4-inch DENS-DECK Roof Board by G-P Gypsum Corp. or 1/4-inch DENS-DECK Prime Roof Board by G-P Gypsum Corp.
- b. Performance Characteristics:
 - 1) Nonstructural, glass mat-embedded, water-resistant gypsum core panels.
 - 2) UL Classified Type DGG when tested in accordance with ASTM E119.
 - 3) ASTM C1177 compliance.
 - 4) Noncombustible core per ASTM E136.
- c. Contractor Option Provide any of the following products with acceptance within roofing manufacturer's warranty:
 - 1) Invinsa Roof Board by Johns Manville.
 - 2) SECUROCK by USG.

2.4 INSULATION ACCESSORIES

- A. General: Furnish roofing insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.
- B. Fasteners: Fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470.
 - 1. Insulation, Tapered Insulation and Cover Board:
 - a. Mechanical fasteners for securement of insulation, tapered insulation, and cover board panels to decking must be approved by the insulation manufacturer for the system specified.
 - b. The same brand fastener is to be used throughout the Work.
 - c. Number of fasteners and layout to meet requirments of ASCE 7-10 and shall be engineered by manufacturers professional engineer.
 - d. Length of fastener to be determined by the thickness of the decking and any fill, and will vary with the thickness of the insulation; fasteners must be of appropriate length to achieve a minimum of 1 inch penetration.
 - e. Acoustical Deck Locations: Fasteners not to exceed length necessary to remain concealed in acoustical cells of steel deck.
- C. Tapered Edge Strips: Rigid, cellulosic-fiber insulation board, complying with ASTM C 208, Type 2.

2.5 ELECTRIC FIELD VECTOR MAPPING SYSTEM

- A. General: Provide a leak detection system that delivers a pulsating low voltage potential difference between the roof surface and the structural deck. The system is designed to detect a breach in the roof membrane system by detecting an electrical connection.
 - 1. The wire component of the system shall remain a part of the roof system, so that future leak detection tests are possible.
 - 2. Basis of Design product, International Leak Detection.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with conditions affecting performance of roofing system.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION - INSULATION

- A. Lay insulation with longest dimension perpendicular to direction of membrane seams, with joints staggered and tightly butted.
- B. Install insulation to fit tightly around projections.
 - 1. Insulation joints shall be 1/4" or less in width; joints wider than 1/4" shall be filled in with appropriate insulation.
 - 2. All joints shall be staggered; stagger joints within layers at least 6"; offset joints of overlaying layers, at least 6" in both directions, from joints of previous layer.
- C. Secure insulation in place with screw and plate type fastener.
- D. Install insulation fasteners with depth-sensing screw fastening tool to prevent overdriving.
- E. Replace broken insulation with undamaged pieces, 6" by 6" minimum, properly fastened in place.
- F. Do not install more insulation than can be covered and made watertight with roofing membrane by end of same working day.
- G. Taper insulation around roof drains to prevent membrane from bridging.

3.4 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- B. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply solvent-based bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- E. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 - 1. Minimum Seam Width: 1 1/2 inch.

- 2. All seams to be rolled during hot air welding process.
- 3. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
- 4. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
- 5. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.

3.5 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 VERIFICATION OF MEMBRANE INTEGRITY

- A. General: After installing roof horizontal membrane, verify installed membrane is waterproof. Provide testing to verify membrane is free of any holes, open seams and capillary defects that will allow water to penetrate the building envelope.
 - 1. Contractor to have mechanics on site during test to immeadiately repair any breaches in the membrane.
 - 2. Utilize electrical conduction method EFVM (Electric Field Vector Mapping) as designed by International Leak Detection as follows:
 - a. Installation of EFVM impulse conductor wire around perimeter of area to be tested. The testing agency will determine the size and shape of the areas. Areas will typically range between 2000sf and 7500sf. The conductor wire will consist of braided polyethylene (1.5 mm in diameter) interwoven with a minimum of 9 strands of stainless steel wire. The conductor wire will have a tensile strength of not less than 180 lbs.
 - b. Place conductor wire 4 inches from the perimeter and secure against accidental movement or damage. Place so not to create a tripping hazard. Place wire directly on membrane.
 - c. Isolate all metal items contacting the membrane by placing isolation strands of conductor wire to isolate the field or by temporarily removing the metal items if possible.
 - d. Isolate field of membrane from contact with grounded soil or structure contacting the membrane by placing isolation strands of conductor wire.
 - e. Wet the test area with potable water sufficiently to create a continuous conducting "plate" above the membrane.
 - f. Attach EFVM impulse generator to conductor wire with removable connectors and to ground or building structure creating a potential circuit. (The circuit will complete if water finds a path to ground by way of a breach in the membrane.)
 - g. Deliver a 1 second long, 40 volt potential electrical pulse to the conductor wire at an average rate of one pulse every three seconds.

- h. Utilizing a EFVM potentiometer and two probes placed at the surface of the membrane, detect the presence or absence of electrical flow across the surface to the membrane.
- i. If there is no flow detected after a systematic search, then the certified inspector shall report the installed membrane in that area tested free of holes, seam and capillary defects and is therefore waterproof at that time.
- j. If there is flow detected during the search, then the certified inspector shall work to identify the source of electricity and therefore the breach in the membrane. The technician shall report to the roofing contractor immediately if possible the exact location of any defects on the installed membrane in that area tested.
- k. Defects found shall be repaired and retested.
- 1. The technician providing the EFVM test shall provide a report of each day's test results containing a written description and photograph of all defects and any corrections made and a schematic CAD drawing indicating location of stationary conductor wire and of any defects found in testing to within 1 inch of accuracy. This report shall be made in hard copy and submitted to the Architect and Owner.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:
 - 1. Manufactured reglets.
 - 2. Formed wall flashing and trim.
 - 3. Exposed trim not part of other assemblies.
 - 4. Parapet wall covering.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.
 - 1. Include similar samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Sheet Metal Flashing: 12 inches long. Include fasteners, closures, and other attachments.
 - 2. Trim: 12 inches long. Include fasteners and other exposed accessories.
 - 3. Accessories: Full-size Sample.

1.4 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- B. Mockups: Demonstrate aesthetic effects and set quality standards for fabrication and installation, as appropriate within wall construction mockups required under other sections.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, and roof-mounted equipment.
 - 2. Review methods and procedures related to sheet metal flashing and trim.
 - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.6 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 PRODUCTS

2.1 SHEET METALS

- A. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:
 - 1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.
 - b. Color: Match Architect's samples.
 - 2. Aluminum Thickness: Fabricate components not specified under other Sections or indicated on Drawings, from coil stock minimum thickness 0.040 inch.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

- 1. Finish: No. 2D (dull, cold rolled).
- 2. Through-wall: Minimum 0.0156 inch thick.

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 - 2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - 3. Blind Fasteners: High-strength stainless-steel rivets.
- C. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factorymitered and -welded corners and junctions.
 - 1. Available Manufacturers:
 - a. Fry Reglet Corporation.
 - 1) Heckmann Building Products Inc.
 - 2) Hickman, W. P. Company.
 - 3) Keystone Flashing Company, Inc.
 - 4) Sandell Manufacturing Company, Inc.
 - b. Material: Stainless steel, 0.0187 inch thick.
 - c. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - d. Masonry Type: Provide with top flange to set in mortar joint; bent leg to resist pull-out.

e. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

2.5 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12 foot long, sections, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch- high end dams. Fabricate from the following material:
 - 1. Stainless Steel: 0.0156 inch thick.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
 - 1. Coat side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 - 1. Aluminum: Use aluminum or stainless-steel fasteners.
 - 2. Stainless Steel: Use stainless-steel fasteners.
- H. Seal joints sealant as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for

- installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
- 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.
 - 1. Do not solder prepainted, metallic-coated steel and aluminum sheet.
 - 2. Stainless-Steel Soldering: Pretin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
 - 3. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.
- J. Aluminum Flashing: Rivet or weld joints in uncoated aluminum where necessary for strength.

3.3 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 71 00 - MANUFACTURED ROOF SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following manufactured roof specialties:
 - 1. Copings.
 - 2. Roof edge flashings.
 - 3. Prefabricated through wall scupper.
 - 4. Prefabricated Roof Expansion Joint Covers.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Manufacture and install manufactured roof specialties to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. FMG Listing: Manufacture and install copings and roof edge flashings that are listed in FMG's "Approval Guide" and approved for Windstorm Classification; Wind Zone 2 ratings. Identify materials with FMG markings.
 - 1. FM tested and approved means of fastening.
- C. Thermal Movements: Provide manufactured roof specialties that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Water Infiltration: Provide manufactured roof specialties that do not allow water infiltration to building interior.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Qualification data for manufacturer and qualified professional engineer licensed in the State of Maryland.
- C. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer (licensed in Maryland); show layouts of manufactured roof specialties, including plans and elevations. Identify factory- vs. field-assembled work. Include the following:
 - 1. Details for fastening, joining, supporting, and anchoring manufactured roof specialties including fasteners, clips, cleats, and attachments to adjoining work.
 - 2. Details for expansion and contraction.
- D. Fabrication Samples: For copings and roof edge flashings made from 12-inch lengths of full-size components including fasteners, cover joints, accessories, and attachments.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, verifying compliance of copings and roof edge flashings with performance requirements.
- F. LEED Submittals:

- 1. Credit MR 4.1 and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - a. Contributions to this Credit include recycled content of steel and aluminum.
- 2. Coordinate with Construction Waste Management requirements.
- G. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- B. Manufacturer Qualifications: Manufacturer capable of providing engineering and field service representation during construction.
 - 1. Engineering Responsibility: Preparation of data for including the following:
 - a. Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in the State of Maryland.
 - 2. Company with a minimum of ten years of continuous experience manufacturing perimeter metal systems of the type specified and capable of providing the following information.
 - 3. List of five other projects of similar size, including approximate date of installation and name of architect for each.
- C. Product Qualifications: Products must be accepted by roofing manufacturer within the total system warranty and listed by name on the roofing manufacturer's letterhead.

1.5 COORDINATION

A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.6 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. Special Warranty for Wind Resistance:
 - 1. Manufacturer shall guarantee that a standard size roof edge system, when installed per manufacturer's instructions, will not blow off, leak, or cause membrane failure, even in wind conditions up to 110 mph, or the manufacturer shall at their option repair or replace their materials.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 3. Basis-of-Design Product: The designs for copings and roof edge flashings are based on the products named. Subject to compliance with requirements, provide either the named products or comparable products by one of the other manufacturers specified.

2.2 EXPOSED METALS

- A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and finish indicated, finished as follows:
 - 1. Surface: Smooth, flat finish.
 - 2. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Exterior Finish: Fluoropolymer 2-Coat Coating System Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear 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 2605 and with coating and resin manufacturers' written instructions.
 - 1) Color: Match Architect's sample.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
 - High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Exterior Finish: Fluoropolymer 3-Coat Coating System Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear 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 2605 and with coating and resin manufacturers' written instructions.
 - 1) Color: Match Architect's sample.

2.3 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

C. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
- C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 COPINGS

- A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet, concealed anchorage, concealed splice plates with same finish as coping caps, one-piece corner units, and end cap units.
 - 1. Available Products Typical:
 - a. Permasnap by Hickman, W. P. Company.
 - b. PerformaEdge Coping by Imetco.
 - c. Perma-Tite Coping by Metal-Era.
 - d. Roofing Manufacturer.
 - 2. Basis-of-Design Product Special Profiles: Refer to Drawings for custom profile.
 - a. Profile by Hickman, W. P. Company.
 - b. PerformaEdge (Custom) Coping by Imetco.
 - 3. Coping Caps: Snap-on, fabricated from the following exposed metal:
 - a. Aluminum: 0.063 inch thick.
 - 4. Coping Cap Color: Match Architect's sample.
 - 5. Corners: Continuously welded; field verify actual constructed angles for factory-fabricated project-specific prefabricated corners.
 - 6. Transitions: Provide project-specific factory-fabricated continuously welded transitions including, but not limited to, transition miters, "z"-miters (steps in exterior wall 18 inches or less), tee miters, end terminations and end caps.
 - 7. Snap-on Coping Anchor Plates: Concealed, galvanized steel sheet, 12 inches wide, 0.028 inch thick, with integral cleats.
 - 8. Face Leg Cleats: Concealed, continuous galvanized steel sheet.

2.6 ROOF EDGE FLASHINGS

A. Canted Roof Edge Fascia: Manufactured, two-piece, roof edge fascia consisting of snap-on compression-clamped metal fascia cover in section lengths not exceeding 12 feet and a continuous formed galvanized steel sheet cant dam, 0.028 inch thick, minimum, with integral drip edge cleat.

- 1. Available Products Typical:
 - a. Safeguard NP by Hickman, W. P. Company.
 - b. PerformaEdge Fascia by Imetco.
 - c. System 300 Perma-Tite Fascia by Metal-Era.
 - d. Roofing Manufacturer.
- 2. Basis-of-Design Product Special Profiles: Refer to Drawings for custom profile.
 - a. Profile by Hickman, W. P. Company.
 - b. PerformaEdge (Custom) Fascia by Imetco.
- 3. Fascia Cover: Fabricated from the following exposed metal:
 - a. Aluminum:
 - 1) Typical: Minimum 0.063 inch thick.
 - 2) Special Profiles: Minimum 0.063 inch thick.
- 4. Fascia Cover Color: Match Architect's sample.
- 5. Provide matching mitered and welded corner units; field verify actual constructed angles for factory-fabricated project-specific prefabricated corners.
- 6. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.

2.7 THROUGH-WALL SCUPPERS

- A. Prefabricated box scupper with flush conductor head, formed from minimum 0.063 inch thick aluminum.
- B. Fabrication:
 - 1. Welded construction.
 - 2. Conductor box design to provide a 3 inch wide front frame (box full width of outside front frame edges); backside picture frames to be 3 inches and shipped loose.
 - 3. 3 inch slotted nailing flange for anchoring to roof deck.
 - 4. Basis-of-Design Product: Thru-Wall Scupper by Metal-Era, Inc. or a comparable product by perimeter metal manufacturer.
 - 5. Color to match Architect's sample.

2.8 PREFABRICATED ROOF EXPANSION JOINT COVERS

- A. Basis-of-Design: Roof to Roof and Roof to Wall Expansion Joint by W.P. Hickman.
- B. Other Acceptable Manufacturers:
 - 1. Metal Era.
 - 2. Imetco.
- C. Characteristics:
 - 1. Formed metal cap; concealed joint cover and gutter chair.
 - 2. 20 gage galvanized steel articulating cleat.
 - 3. Predrilled for shouldered fasteners 18 inches o.c. on both curbs.
 - 4. Provide with in-joint condensate seal and insulation.

2.9 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations

in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
 - 1. Examine walls, roof edges, and parapets for suitable conditions for manufactured roof specialties.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.
 - 1. Install manufactured roof specialties with provisions for thermal and structural movement.
 - 2. Torch cutting of manufactured roof specialties is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
- C. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.
- D. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
- E. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.
- F. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- G. Seal joints with elastomeric sealant as required by manufacturer of roofing specialties.

3.3 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings to resist uplift and outward forces according to performance requirements.
 - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's recommended spacing.

3.4 ROOF EDGE FLASHING INSTALLATION

A. Install cleats, cant dams, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings to resist uplift and outward forces according to performance requirements.

3.5 CLEANING AND PROTECTION

- A. Clean off excess sealants.
- B. Remove temporary protective coverings and strippable films as manufactured roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings and pieces of flashing. Maintain in a clean condition during construction.
- C. Replace manufactured roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 71 10 - ROOF PAVER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Furnish and install a complete Architectural Pavers and Adjustable Pedestals deck support system with a maximum cavity height of up to 22 inches.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM D 638 Tensile Properties of Plastics
 - 2. ASTM D 790 Flexural Properties of Unreinforced and Reinforced Plastics Insulating
 - 3. ASTM D 1525 Vicat Softening Temperature of Plastics

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Samples:
 - 1. Architectural Pavers: Submit samples for type, color and texture required.
 - 2. Pedestals: Submit sample of each pedestal component.
 - 3. PVC Pipe: Submit 12-inch long sample of PVC pipe.
- C. Shop Drawings: Submitted by contractor showing all components required for the paver & pedestal requirements. Shop drawings shall include plan drawings showing layout of all paver areas and detail drawings showing how the various components of the system fit together. Include manufacturer's literature completely describing all components of the paver pedestal systems and giving detailed installation recommendations and instructions. Also included detailed installation drawings for all precast pavers.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All products covered under this Section shall be produced by a single manufacturer unless otherwise specified with a minimum of fifteen (15) years proven production experience.
- B. Installer Qualifications: Installer shall have a minimum of three (3) years proven construction experience and be capable of estimating & building from blueprint plans and details, determining elevations, in addition to proper material handling. All Work must comply with Tile Tech Pavers installation application procedures for pedestal mounted pavers as specified herein.
- C. Special Consideration: The installer and or subcontractor must assume the responsibility for and take into consideration (1) the structural capability and adequacy of the structure to carry the dead and live load weight(s) involved, and (2) that the density of any insulation is satisfactory to resist crushing and damaging the waterproofing membrane.

1.6 DELIVERY, STORAGE, AND HANDLING

A. In accordance with provisions of Section 01300.

B. Protect Concrete Pavers and Pedestal System during shipment, storage and construction against damage. Store a minimum of 4 inches off the ground in a dry location and cover with polyethylene to protect from contact with materials which would cause staining or discoloration.

1.7 PROJECT CONDITIONS

- A. Tile Tech Pedestal System specified are to be used with pedestrian traffic only & all four (4) sides of a deck system must restrain and contain the decking panels with perimeter blocking or walls. Decking panels must not be allowed to move laterally.
- B. All membrane waterproofing and protection board surfaces to receive pedestals must be broom clean, frost free, and free of dirt, oil or any rough foreign matter, which may impair the waterproofing / roofing manufacturers guarantee or protection requirements.
- C. The substrate that is to receive pedestals must have slope and provide positive and adequate drainage in accordance with good building practice and applicable building codes.
- D. Decks over Roofing and Waterproofing;
 - 1. If high density closed cell extruded 60psi polystyrene insulation is installed on top of the membrane in a protected membrane system, Tile Tech Pedestals may be installed directly on top of this type of insulation.
 - 2. Do not use Tile Tech Pedestals over any insulation less than 60psi or with low density polystyrene (bead board) insulation.
- E. Installation or anticipated installation of additional items on top of the deck such as planters, hot tubs, sculptures, or industrial equipment must be supported directly by additional pedestals that are in addition to the main deck paver/tile pedestal system. Failure to adequately support the additional weight of any such features or items may cause significant damage to the deck, underlying structure, or waterproofing.

1.8 WARRANTIES / GUARANTEES

A. Tile Tech Pedestal System (pavers and pedestals) shall remain free from defects for a period of ten (10) years. The contractor shall warrant that his work will remain free from defects of labor and materials used in conjunction with his work in accordance with the general conditions for this project or a maximum of three (3) years.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Tile Tech Pavers Inc.: www.tiletechpavers.com
- B. Hanover Elevator Pedestal System.
- C. Paver Pedestal Systems equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals are approved in writing by the Architect prior to bid.

2.2 MATERIALS

A. PAVERS:

- 1. Basis-of-Design: Hanover Tudor by Hanover.
- 2. Color: As selected by Architect from manufactueres standard range.
- 3. Size: 20"x20"x2" nominal.
- 4. Finish: Shot-blasted with 3/16" bevel on all four (4) sides of finished surface.

B. PEDESTALS:

- 1. Uni-Just[™] Pedestals: PVC Pipe & Screw Adjustable
 - a. Assembly consist of 5 parts: Uni-BaseTM, Uni-CollarTM, Uni-InsertTM, Uni-CapTM & Buffer Pads.
 - b. Use SDR35 PVC pipe to accommodate various HEIGHT adjustments from 2-½" to 22".
 - c. Additional precise height adjustment of up to 1-½" with the use of Uni-InsertTM which can screw up or down while loaded.
 - d. Self-leveling and can tilt in any direction to a level plane to accommodate SLOPE adjustments from 0% to 6%.
 - e. Base diameter of 7-inch with bearing surface area of thirty eight (38) square inches.
 - f. Made of 100% recycled and flame resistant High Density Polypropylene.
 - g. Use of Buffer Pads under Uni-JustTM Pedestals is MANDATORY.
- 2. Uni-ShimsTM: 1/8-inch & 1/16-inch Thick
 - a. Can be used whole or broken into halves or quarters and can be stacked up to 2 high.
 - b. Used on top or under Uni-Just™ Pedestals for fine leveling of pedestals and or individual pavers.
 - c. Made of high impact and flame resistant ABS plastic.

C. OTHER COMPONENTS:

- 1. Pedestal Pipe: 4-inch diameter SDR35 PVC Sewer Pipe
 - a. Used with either Uni-JustTM Pedestals and is cut to required height.
 - b. Dimensions: 4.215-inch outside diameter & 3.890-inch inside diameter.
 - c. Meet ASTM D-3034 and F-679.
- 2. Protection Course:
 - a. Protection board (required over insulated BUR systems, and when specified for use over bituminous asphalt-based waterproofing): W.R. Meadows "Vibraflex" or equal, minimum 3/8- inch thick asphaltic composition protection board.

2.3 PERIMETER CONTAINMENT AND SUPPORT

- A. The complete assembly of insulation (if used), protection board (if used), drainage mat (if used), pedestals and pavers must be restrained at the perimeter of the deck area.
- B. Perimeter parapet walls, concrete dividers or other perimeter restraint must be capable of resisting lateral forces (including seismic and wind). Cumulative movement in excess of 1/8 inch will void the Tile Tech Pavers Pedestal System warranty.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to starting work inspect the substrate to ensure that it has been properly prepared to accept the Tile Tech Pedestal System. The substrate and or surface shall be clean and free of any projections and debris which may impair the performance of the pedestal and or the deck system. Verify all elevations, required pedestal heights and deck dimensions. Commencement of work shall imply acceptance of surfaces & deck conditions.
- B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 PREPARATION

- A. The substrate surface that will receive the Pedestal System must be well compacted (on Grade) or structurally capable of carrying the dead and live loads anticipated.
 - 1. Insulation OVER the membrane: (Option 1) Insulation and/or protection board (if specified) must be applied over the waterproofing substrate and/or specified drainage mat. Install the system according to the membrane manufacturer's recommendations and specifications.
 - 2. Insulation UNDER membrane: (Option 2) Insulation required to be installed within a roofing system below deck supports must meet the roofing membrane manufacturers' specifications and must have a minimum core density of 60psi.
 - 3. Protection Board: (for asphalt type systems used over waterproofing) Full coverage 1/8-inch asphaltic composition protection board is recommended. When protection is specified only under the pedestal cut protection board pads to extend beyond the outside perimeter of the pedestal system base or buffer pad by a minimum of TWO (2) inch.
 - 4. Drainage Mat: (when desired or specified) Install drainage mat according to the manufacturers recommendations to avoid crushing.

3.3 INSTALLATION

A. Install in accordance with Tile Tech Pavers and other contributing manufacturer's instructions. Installation requirements vary for each individual project site. Decking paver or tile used, pattern, grid layout, starting point, and finished elevation should be shown on plan view shop drawings, which have been prepared and approved by the designer, installing contractor and/or owner.

B. GRID LAYOUT AND ELEVATIONS:

- 1. Once the starting point and the finished elevation of the deck surface have been determined, the "Top of Pedestal Elevation" (finished elevation less decking paver or tile thickness) is established and marked around the perimeter using a transit water level or laser leveling device.
- 2. Precise measurements should be taken and deck area should be accurately defined. Mark off and 'square up' all outside edges with control lines using "snapped" chalk lines. Mark two (2) lines that are perpendicular to each other across the deck area. Continue to mark a grid of lines in both directions marking the location of each pedestal. Use the control lines as references to periodically check and assure a square layout during installation.
- 3. Next, a pedestal must be placed where each measured grid line meets the perimeter. Remove two (2) spacer tabs in line with one another atop each pedestal system placed around the perimeter. Remove all four (4) spacer tabs at corners.
- 4. Adjust each pedestal height to the "Top of Pedestal Elevation" marked on the perimeter. Position the pedestal as close to the edge of the perimeter as possible, with the two remaining spacer tabs aligned with the grid line. Using the elevation marked on the perimeter, stretch a mason's line along and slightly ahead of the second row of pedestals. A laser leveling device may also be used for this purpose.
- 5. On larger decks, it is recommended that Tile Tech Pedestal System be pre-assembled and pre-set to the proper elevation and placed in position prior to the installation of decking paver or tile.
- 6. As the pedestals located along the grid lines are loaded with pavers or tiles, fine vertical height adjustment can be made by inserting and rotating, from the top, a T-handle Hex Key in to the Uni-InsertTM of the Pedestal assembly. Clockwise rotation of the

- Uni-InsertTM will raise the bearing surface and the deck. Counter-clockwise rotation will lower the top bearing surface and deck.
- 7. Always maintain adequate thread engagement. Tile Tech Pedestal Uni-Insert™ contains a locking tab that will not allow the screw to extend past its maximum extension. Never use if the locking tab is broken. If the height required goes beyond the Uni-Insert™ limit re-cut PVC pipe to the correct height and re-assemble the pedestal using the correct size pipe.
- 8. Slight irregularities in decking paver or tile thickness can be compensated for by using one (1) to two (2) shim segments. Place on top of the pedestal, under the corner(s) of the decking paver or tile. Use no more than two (2) shims on top of the pedestal and always adhere quartered (1/4) wedges with construction adhesive.

C. SLOPE AND HEIGHT COMPENSATION:

- 1. Uni-Just™ Pedestals can provide both slope and height compensation to maintain a level decking surface over sloping substrates and is accomplished using a combination of the following:
 - a. PVC Pipe cut to varying lengths to compensate for GENERAL height requirements.
 - b. SCREW extension for PRECISE height adjustment.
 - c. Self-Leveling cap that pivots and tilts in any direction for slope compensation from 0% to 6%.
- 2. Tile Tech Pedestals are designed to be rotated for final precise adjustment when they are fully loaded. Pedestals should be leveled in each succeeding row as the installation proceeds. Final height adjustment or maintenance is easily made by simply using a T-handle Hex Key that allows you to adjust the pedestals without removing the pavers. T-handle Hex Key is inserted between the four paver corners to engage Uni-InsertTM portion and is adjusted clockwise or counter clockwise to level as needed.
- 3. Uni-ShimsTM may be used in multiples, whole or quarters, and placed under the pedestal base or on top the pedestal cap to level pedestals. Use a small amount of construction adhesive to adhere sections of shims and/or whole shims to each other or to the pedestal. DO NOT use construction adhesive to adhere pedestal or shims to insulation, roofing or waterproofing membrane. Additional sections of shims may be used and should be available for regular maintenance.

3.4 PERIMETER CONTAINMENT

A. Any area of the pedestal deck that is not restrained by a parapet or foundation wall must be 'boxed-in' and contained. The deck panels will move if all sides are not adequately restrained. Perimeter framing and edging boards located at the outside of the deck perimeter must be installed to provide restraint. No movement should be allowed at the perimeter of the deck system greater than one tab width.

3.5 FIELD QUALITY CONTROL

- A. Inspect often during installation to assure that grid spacer lines are being maintained in a straight and consistent pattern and that deck pavers or tiles are level and not rocking. Unless otherwise specified in writing to allow for expansion, inspect to assure that all paver spacing between tiles and at perimeter walls does not exceed a tab width. Particular attention should be made to assure that all pedestrian entry or access points to the deck are level and that the deck surface tiles are not randomly raised or uneven creating a tripping or safety hazard.
 - 1. Confirm that deck pedestal height excess of sixteen (16) inches have been braced in accordance with Tile Tech Payers written instructions

3.6 ROUTINE MAINTENANCE AND CARE

- A. The deck owner must perform routine maintenance of the deck. Check for rocking pavers and adjust using T-Handle Hex Key or shim immediately. Pedestals can settle and may have to be realigned. Failure to do so can cause a tripping hazard. Periodically check spacer tabs and immediately replace broken tabs to limit deck movement. Make sure the edge restraint stays intact and structurally sound.
- B. Extra Materials: Deliver supply of maintenance materials to the owner. Furnish not less than 1 percent maintenance materials from same lot as materials installed, and enclosed in protective packaging with appropriate identifying labels.

END OF SECTION

SECTION 07 71 23 - GUTTERS AND DOWNSPOUTS

PART1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pre-fabricated aluminum gutters and downspouts.
- B. Related Sections include the following:
 - 1. Division 7 Section "Sheet Metal Flashing and Trim" for flashings and other sheet metal work.
 - 2. Division 7 Section "Manufactured Roof Specialties" for fasciae and copings.
 - 3. Division 7 Section "Metal Roof Panels" for metal roofing systems.
 - 4. Division 7 Section "Joint Sealants" for field-applied sealants not otherwise specified in this Section.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International: ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. Federal Specification Unit: FS TT-C-494 Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- D. Sheet Metal and Air Conditioning Contractors' National Association, Inc.: SMACNA Architectural Sheet Metal Manual.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- B. Product Data: Submit data on manufactured components, materials, and finishes.
- C. Samples: Submit two samples, 24 inches long illustrating component design, finish, color, and configuration.
- D. LEED Submittals:
 - 1. Credit MR 4.1 and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - a. Contributions to this Credit include recycled content aluminum.
 - 2. Coordinate with Construction Waste Management requirements.

1.4 OUALITY ASSURANCE

A. Perform Work in accordance with SMACNA Manual; maintain one copy of manual on site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack products to prevent twisting, bending, and abrasion, and to provide ventilation; slope to drain.

B. Prevent contact with materials during storage capable of causing discoloration, staining, or damage.

PART 2 PRODUCTS

2.1 GUTTERS AND DOWNSPOUTS

- A. Available Manufacturers:
 - 1. Berger Building Products Corp.
 - 2. Metal-Era.
 - 3. W.P. Hickman Company.
- B. Product Description:
 - 1. Gutters: SMACNA Rectangular style profile; Figure 1-2, Style F.
 - 2. Downspouts: SMACNA round profile; Figure 1-32A.

2.2 COMPONENTS

- A. Pre-Finished Aluminum Sheet:
 - 1. ASTM B209, manufacturer's standard alloy and temper for specified finish; shop pre-coated with three coat PVDF (polyvinylidene fluoride) coating.
 - a. Gutters: 0.050 inch thick.
 - b. Downspouts: 0.050 inch thick.
 - 2. Color: Match Architect's sample.

2.3 ACCESSORIES

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. Anchoring Devices: In accordance with SMACNA requirements.
 - 2. Gutter Supports: Brackets and straps sized per SMACNA Table 1-8.
 - 3. Downspout Supports Typical: Brackets; SMACNA Figure 1-35E.
- B. Strainers: 15 gage stainless steel wire baskets.
- C. Fasteners: Aluminum or Stainless steel, with EPDM washers.
- D. Protective Backing Paint: FS TT-C-494, Bituminous.

2.4 FABRICATION

- A. Form gutters and downspouts of profiles and sizes indicated.
- B. Fabricate with required connection pieces.
- C. Form sections to shape indicated on Drawings, square, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance; allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.5 FACTORY FINISHING

- A. PVDF (polyvinylidene fluoride) Coating: Multiple coat, thermally cured, fluoropolymer system conforming to AAMA 2605.
- B. Color: Custom to match Architect's sample.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify surfaces are ready to receive gutters and downspouts.

3.2 PREPARATION

A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mils.

3.3 INSTALLATION

- A. Join lengths with formed seams sealed watertight.
- B. Support Spacing:
 - 1. Gutters:
 - a. Brackets: 36 inch o.c.
 - b. Straps: 36 inch o.c. offset 18 inches o.c. of bracket locations.
 - 2. Downspouts: SMACNA Figure 1-35.
- C. Flash and seal gutters to downspouts and accessories.
- D. Slope gutters minimum 1/16 inch per foot.
- E. Provide gutter slip joints every 20 feet in length for contraction and expansion; seal joints with sealant of matching color.
- F. Set downspouts plumb and not less than 1 inch from the wall.
- G. Provide leaders to connect gutters on overhanging eaves to downspouts; set leaders with a slope not less than 1/16 inch per foot or more than 30 degrees below a horizontal line.
- H. Fit leaders over the outlet tube in gutter bottom riveted to the downspout; rivet spacing shall be not more than 2 inches.
- I. Set strainers loosely in the outlet tube opening in gutter.
- J. Make joints between lengths of downspouts by telescoping the end of the upper lengths at least 3/4 inch into the lower length.

END OF SECTION

SECTION 07 72 00 - ROOF ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Roof curbs.
 - 2. Equipment supports.
 - 3. Roof hatches.
 - 4. Roof hatch railing.
 - 5. Ladder safty post.

1.2 SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.
- C. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

1.3 OUALITY ASSURANCE

A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers listed in other Part 2 articles.

2.2 METAL MATERIALS

- A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755.
 - 1. Galvanized Steel Sheet: ASTM A 653, G90 coated.
 - 2. Exposed Finishes:
 - a. Roof Curbs, Equipment Curbs and Pipe Supports: Manufacturer's standard powder coat.
 - b. Roof Hatches and Vents: Manufacturer's standard powder coat.
- B. Steel Shapes: ASTM A 36, hot-dip galvanized to comply with ASTM A 123, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.
- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- C. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.
- D. Gaskets: Manufacturer's standard tubular or fingered design of EPDM, or PVC; or flat design of foam rubber.
- E. Elastomeric Sealant: ASTM C 920, polyurethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.4 ROOF CURBS

- A. Roof Curbs: Provide metal roof curbs, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
 - 1. Available Manufacturers:
 - a. Custom Curb, Inc.
 - b. LM Curbs.
 - c. Pate Company (The).
 - d. Roof Products & Systems Corporation.
 - e. Roof Products, Inc.
 - f. ThyCurb; Div. of Thybar Corporation.

- 2. Load Requirements: Indicated on Drawings.
- 3. Material: Galvanized steel sheet, 14 gage thick.
 - a. Finish: High-performance organic coating.
- 4. Liner: Same material as curb, of manufacturer's standard thickness and finish.
- 5. Factory install wood nailers at tops of curbs.
- 6. Factory insulate curbs with 1-1/2-inch thick, glass-fiber board insulation.
- 7. Curb height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer. Fabricate units to minimum height of 10 inches above surface of finished roof, unless otherwise indicated.
- 8. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.5 EQUIPMENT SUPPORTS

- A. Equipment Supports: Provide metal equipment supports, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
 - 1. Available Manufacturers:
 - a. Custom Curb, Inc.
 - b. LM Curbs.
 - c. Pate Company (The).
 - d. Roof Products & Systems Corporation.
 - e. Roof Products, Inc.
 - f. ThyCurb; Div. of Thybar Corporation.
 - 2. Load Requirements: Indicated on Drawings.
 - 3. Material: Galvanized steel sheet, 14 gage thick.
 - a. Finish: High-performance organic coating.
 - 4. Factory-install continuous wood nailers at tops of equipment supports.
 - 5. Metal Counterflashing: Manufacturer's standard removable counterflashing, fabricated of same metal and finish as equipment support.
 - 6. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
 - 7. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.6 ROOF HATCHES

- A. Roof Hatches: Fabricate roof hatches with thermally broken insulated double-wall lids and insulated curb frame with integral deck mounting flange and lid frame counterflashing. Fabricate with welded or mechanically fastened and sealed corner joints. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant stainless steel hardware.
 - 1. Available Manufacturers:
 - a. Basis-of-Design: The Bilco Company.
 - 1) Type 1: Type L-XXTB (3'x6').
 - 2) Type 2: Type F-50TB (4'x4').
 - b. Babcock-Davis / Nystrom.
 - c. J. L. Industries, Inc.
 - 2. Performance characteristics:

- a. Cover and curb shall be thermally broken to prevent heat transfer between interior and exterior surfaces.
- b. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m2) with a maximum deflection of 1/150th of the span or 20 psf (97kg/m2) wind uplift.
- c. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
- d. Operation of the cover shall not be affected by temperature.
- e. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.
- 3. Cover: Shall be 11 gauge (2.3mm) aluminum with a 5" (127mm) beaded flange with formed reinforcing members. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
- 4. Cover insulation: Shall be 3" (75mm) thick polyisocyanurate with an R-value = 18 (U=0.315 W/m2K), fully covered and protected by an 18 gauge (1mm) aluminum liner.
- 5. Curb: Shall be 12" (305mm) in height and of 11 gauge (2.3mm) aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. The curb shall be formed with a 5-1/2" (140mm) flange with 7/16" (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.
- 6. Curb insulation: Shall be 3" (75mm) thick polyisocyanurate with an R-value = 18 (U=0.315 W/m2K).
- 7. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.

8 Hardware

- a. Heavy stainless steel pintle hinges shall be provided
- b. Cover shall be equipped with a spring latch with interior and exterior turn handles
- c. Roof hatch shall be equipped with interior and exterior padlock hasps.
- d. The latch strike shall be a stamped component bolted to the curb assembly.
- e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
- f. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed. .
- g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- 9. Finishes: Factory finish shall be mill finish aluminum.

2.7 ROOF HATCH RAILING

- A. Basis of Design: Bilco Bil-Guard 2.0 Hatch Railing System RL2-TB for 3'x6' Hatch Type 1 and RL2-FTB FOR 4'X4' Hatch Type 2.
- B. Provide on three side of hatch manufacturer's curb mounted railing system complying with OSHA regulation CFR1910.23(a)(2).

- C. Posts and rails are 1-1/4" ID A53 Grade B seamed steel.
- D. Mounting brackets are fabricated from 1/4" thick hot dip galvanized steel.

2.8 LADDER SAFETY POST

- A. Furnish and install at all roof hatch ladders a ladder safety post. The ladder safety post shall be pre-assembled from the manufacturer.
 - 1. Basis-of-Design: Bilco Model LU-1.
- B. Performance characteristics:
 - 1. Tubular post shall lock automatically when fully extended.
 - 2. Safety post shall have controlled upward and downward movement.
 - 3. Release lever shall disengage the post to allow it to be returned to its lowered position.
 - 4. Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" on center and clamp brackets to accommodate ladder rungs up to 1-3/4" in diameter.
- C. Post: Shall be manufactured of high strength square tubing. A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
- D. Material of construction: Shall be steel.
- E. Balancing spring: A stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post.
- F. Hardware: All mounting hardware shall be Type 316 stainless steel.
- G. Finishes: Factory finish shall be yellow powder coat.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Install roof accessories to fit substrates and to result in watertight performance.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.

- D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
- E. Roof Curb Installation: Set roof curb so top surface of roof curb is level.
- F. Equipment Support Installation: Set equipment support so top surface of equipment support is level.
- G. Roof Hatch Installation:
 - 1. Check roof hatch for proper operation.
 - 2. Adjust operating mechanism as required.
 - 3. Clean and lubricate joints and hardware.
- H. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

3.3 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION

SECTION 07 81 00 - APPLIED FIREPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fireproofing of interior structural steel.

1.2 REFERENCE STANDARDS

- A. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- B. ASTM E605 Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2011).
- C. ASTM E736 Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2000 (Reapproved 2011).
- D. ASTM E760/E760M Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2015)e1.
- E. ASTM E761 Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2011).
- F. ASTM E937 Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2011).

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data indicating product characteristics.
- C. Shop Drawings: Structural framing plans indicating the following:
 - 1. Locations and types of surface preparations required before applying sprayed fire-resistive material.
 - 2. Extent of sprayed fire-resistive material for each construction and fire-resistance rating, including the following:
 - a. Applicable fire-resistive design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 - b. Minimum thicknesses needed to achieve required fire-resistance ratings of structural components and assemblies.
 - c. Designation of restrained and unrestrained conditions based on definitions in ASTM E 119, Appendix X3 as determined by a qualified professional engineer.
 - 3. Treatment of sprayed fire-resistive material after application.
- D. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, for:
 - 1. Bond Strength.
 - 2. Bond Impact.
 - 3. Compressive Strength.
 - 4. Fire tests using substrate materials similar those on project.
- E. Manufacturer's Certificate: Certify that sprayed-on fireproofing products meet or exceed requirements of contract documents.
- F. LEED Submittals:

- 1. Credit EQ 4.1: Documentation of VOC content for adhesives and sealants applied within the waterproofing envelope.
- 2. Credit EQ 4.2: Documentation of VOC content for paints or coatings applied within the waterproofing envelope.
- 3. Credit MR 4: Documentation indicating percentages by weight of postconsumer and preconsumer recycled content; include statement indicating cost of each product having recycled content.
- G. Manufacturer's Field Reports: Indicate environmental conditions under which fireproofing materials were installed.

1.4 FIELD CONDITIONS

- A. Do not apply spray fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C. Provide temporary enclosure to prevent spray from contaminating air.

1.5 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
 - 1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
 - 2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Carboline Company: www.carboline.com.
 - 1. Concealed Applications: Pyrolite 15.
 - 2. Exposed Applications: Pyrocrete 22.
- B. Grace Construction Products: www.na.graceconstruction.com.
 - 1. Concealed Applications: Monokote Type MK-6/CBF.
 - 2. Exposed Applications: Monokote Type Z106.
- C. Isolatek International Inc: www.isolatek.com.
 - 1. Concealed Applications: Cafco 300.
 - 2. Exposed Applications: Cafco 400.

2.2 FIREPROOFING ASSEMBLIES

2.3 MATERIALS

- A. Sprayed Fire-Resistive Material for Interior Applications: Manufacturer's standard factory mixed material, which when combined with water is capable of providing the indicated fire resistance, and conforming to the following requirements:
 - 1. Bond Strength: 200 psf, minimum, when tested in accordance with ASTM E736 when set and dry.
 - 2. Compressive Strength: 850 pounds per square inch, minimum.

- 3. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760.
- 4. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937.
- 5. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, when tested in accordance with ASTM E84.
- B. Provide UL fire-rated assemblies to hourly ratings as follows:
 - 1. Interior columns: 2 hours.
 - 2. Interior girders: 2 hours.
 - 3. Interior floors: 2 hours.
 - 4. Interior roof deck: 2 hours.

2.4 MATERIALS

- A. Low Density Sprayed Fire-Resistive Material: Factory mixed, cementitious material blended for uniform texture with vermiculite or lightweight synthetic aggregate, and conforming to the following requirements:
 - 1. Bond Strength: ASTM E 736, 200 psf when set and dry.
 - 2. Bond Impact: ASTM E 760, no cracking, flaking or delamination.
 - 3. Dry Density: ASTM E 605, minimum average density of 14 lb/cu ft, with minimum individual density of any test sample of 13 lb/cu ft.
 - 4. Compressive Strength: ASTM E 761, minimum 7.0 psi.
 - 5. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, when tested in accordance with ASTM E 84.
 - 6. Location: Concealed locations.
- B. Medium Density Sprayed Fire-Resistive Material: Factory mixed, Portland cement blended for uniform texture with mineral aggregates or mineral fibers and additives, without chlorides, approved for exterior use and conforming to the following requirements:
 - 1. Location: Exposed interior locations.

2.5 ACCESSORIES

- A. Primer Adhesive: Of type recommended by fireproofing manufacturer; comply with low-emitting requirements specified in Section 01 61 16.
- B. Overcoat: As recommended by manufacturer of fireproofing material.
- C. Metal Lath: Expanded metal lath; 3.4 lb/sq ft, galvanized finish.
- D. Water: Clean, potable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.2 PREPARATION

- A. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials that could affect bond by scraping, brushing, scrubbing, or sandblasting.
- C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- D. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- E. Close off and seal duct work in areas where fireproofing is being applied.

3.3 APPLICATION

- A. Install metal lath over structural members as indicated or as required by UL Assembly Design Numbers.
- B. Apply primer adhesive in accordance with manufacturer's instructions.
- C. Apply fireproofing in thickness and density necessary to achieve required ratings, with uniform density and texture.
- D. Apply fireproofing in sufficient thickness to achieve required ratings, with as many passes as necessary to cover with monolithic blanket of uniform density and texture.
- E. In exposed locations, trowel surface smooth and form square edges, using tools and procedures recommended by fireproofing manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Provide independent third-party inspection of the installed fireproofing after application and curing for integrity, prior to its concealment. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings. Perform testing in accordance with IBC 1705.13.
- B. Independent third-party inspector to re-inspect the installed fireproofing for integrity of fire protection, after installation of subsequent Work.
- C. Repair or replace any damaged areas of fireproofing.

3.5 CLEANING

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.
- C. At exposed fireproofing, clean surfaces that have become soiled or stained, using manufacturer's recommended procedures.

END OF SECTION

SECTION 07 84 00 - FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

- A. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials; 2015.
- B. ASTM E814 Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.
- C. ITS (DIR) Directory of Listed Products; current edition.
- D. FM 4991 Approval Standard for Firestop Contractors; 2013.
- E. FM P7825 Approval Guide; Factory Mutual Research Corporation; current edition.
- F. UL (FRD) Fire Resistance Directory; current edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. LEED Report: Submit VOC content documentation for all adhesives, sealants and primers.
 - 1. Comply with VOC content limits of Section 01 61 16.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Installer Qualification: Submit qualification statements for installing mechanics.

1.5 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the specified fire ratings when tested in accordance with ASTM E 814 and ASTM E 119.
 - 1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
- B. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:.
 - 2. With minimum 3 years documented experience installing work of this type.
 - 3. Able to show at least 5 satisfactorily completed projects of comparable size and type.
 - 4. Approved by firestopping manufacturer.

C. Installing Mechanic's Qualifications: Trained by firestopping manufacturer and able to provide evidence thereof.

1.6 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.1 FIRESTOPPING - GENERAL REQUIREMENTS

A. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

2.2 FIRESTOPPING SYSTEMS

- A. F-Rated (Flame Rated) Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated as determined per ASTM E814, UL 1479 but not less than that equaling or exceeding the fire resistance rating of the construction penetrated.
- B. T-Rated (Temperature Rated) Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas; T-rated assemblies are required where specified by codes or where the following conditions exist:
 - 1. Where firestop systems protect penetrations located outside of wall cavities.
 - 2. Where firestop systems protect penetrations located outside fire resistive shaft enclosures.
 - 3. Where firestop systems protect penetrations located in construction containing doors required to have a temperature rise rating.
 - 4. Where firestop systems protect penetrating items larger than a 4 inch diameter nominal pipe or 16 square inches in overall cross sectional area.
- C. Non-Rated Through-Penetraiton Requirements: At all penetrations in non-rated assemblies, fill the annular space around penetrating object with mineral wool and secure in place to resist the free passage of flame and the products of combustion.
 - 1. All unused penetrations shall be sealed closed with materials matching the material penetrated.
- D. Fire Resistive Joint Sealants: Provide joint sealants with fire resistance ratings indicated, as determined per UL 2079 or (ASTM E1399, E1966 and E2307), but not less than that equaling or exceeding the fire resistance rating of the construction in which the joint occurs.
- E. Firestopping Sealants: Comply with low-emitting requirements specified in Section 01 61 16.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to arrest liquid material leakage.

3.3 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 authority having jurisdiction.
- C. Install labelling required by code. Identify penetration firestopping wiht preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visibe to anyone seeking to remove penetrating itmes or firestopping. Use mechanical fasteners or self-adhering type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning Penetration Firestopping Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing and inspecting agency, UL system, F-rating, T-rating, and the houly rating of the wall.
 - 4. Date of installation.
 - 5. Manufacturer's name, and product number.
 - 6. Installer's name.

3.4 FIELD QUALITY CONTROL

- A. Provide independent third-party inspection of the installed firestopping after application and prior to its concealment.
- B. Repair or replace any damaged areas of firestopping.

3.5 PROTECTION

- A. Clean adjacent surfaces of firestopping materials.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 84 46 - FIRE-RESISTIVE JOINT SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes fire-resistive joint systems for the following:
 - 1. Floor-to-floor joints.
 - 2. Floor-to-wall joints.
 - 3. Head-of-wall joints.
 - 4. Wall-to-wall joints.
 - 5. Perimeter fire-resistive joint systems consisting of floor-to-wall joints between perimeter edge of fire-resistance-rated floor assemblies and exterior curtain walls.
 - 6. Smoke seals.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.
- B. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, and with movement capabilities indicated as determined by UL 2079.
- C. Perimeter Fire-Resistive Joint Systems: For joints between edges of fire-resistance-rated floor assemblies and exterior curtain walls, provide systems of type and with ratings indicated below and those indicated on Drawings, as determined by NFPA 285 and UL 2079.
 - 1. UL-Listed, Perimeter Fire-Containment Systems: Integrity ratings equaling or exceeding fire-resistance ratings of floor or floor/ceiling assembly forming one side of joint.
- D. For fire-resistive systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each fire-resistive joint system, show each kind of construction condition in which joints are installed; also show relationships to adjoining construction. Include fire-resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.
- C. Product Certificates: For each type of fire-resistive joint system, signed by product manufacturer.
- D. Qualification Data: For Installer.
- E. LEED Submittals:
 - 1. Credit EQ 4.1: Manufacturers' product data for interior sealants, including printed statement of VOC content in g/L.
 - 2. Credit EQ 4.6: Manufacturer's product data for insulation in compliance with Section 01 61 16.

1.4 QUALITY ASSURANCE

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

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.
- C. VOC content not to exceed 250 g/L.

1.7 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.
- C. Notify Owner's inspecting agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up fire-resistive joint system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector of authorities having jurisdiction have examined each installation.

PART 2 PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS

A. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.

B. Accessories:

- 1. Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article.
- 2. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.
- 3. Holding Clips: Minimum 30 gage by 1 inch wide galvanized sheet steel Z-shaped clips to support safing insulation.

2.2 SLAG-WOOL-FIBER/ROCK-WOOL-FIBER BOARD INSULATION

- A. Available Manufacturers:
 - 1. Fibrex Insulations Inc.
 - 2. Owens Corning.
 - 3. Thermafiber.
- B. Unfaced, Slag-Wool-Fiber/Rock-Wool-Fiber Board Insulation: ASTM C 612, maximum flame-spread and smoke-developed indexes of 15 and 0, respectively; passing ASTM E 136 for combustion characteristics.
 - 1. Nominal minimum density of 4 lb/cu. ft.
 - 2. Fiber Color: Regular color, unless otherwise indicated.
 - 3. Fiber Color: Darkened, where indicated.
 - 4. Uses: Where indicated and as fire safing insulation.
- C. Foil-Faced, Slag-Wool-Fiber/Rock-Wool-Fiber Board Insulation: ASTM C 612; faced on 1 side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 25 and 5.
 - 1. Nominal minimum density of 4 lb/cu. ft.
- D. Insulation installed within the waterproofing envelope: comply with low-emitting requirements specified in Section 01 61 16.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.

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

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.
- B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply fill materials so they contact and adhere to substrates formed by joints.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect fire-resistive joint systems and prepare inspection reports.
- B. Testing Services: Inspecting of completed installations of fire-resistive joint systems shall take place in successive stages as installation of fire-resistive joint systems proceeds. Do not proceed with installation of joint systems for the next area until inspecting agency determines completed work shows compliance with requirements.
 - 1. Inspecting agency shall state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.
- C. Remove and replace fire-resistive joint systems where inspections indicate that they do not comply with specified requirements.
- D. Additional inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and fire-resistive joint systems comply with requirements.

3.5 CLEANING AND PROTECTING

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

END OF SECTION

SECTION 07 90 05 - JOINT SEALERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sealants and joint backing.
- B. Precompressed foam sealers.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

- A. ASTM C834 Standard Specification for Latex Sealants; 2014.
- B. ASTM C919 Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- C. ASTM C920 Standard Specification for Elastomeric Joint Sealants; 2014.
- D. ASTM C1193 Standard Guide for Use of Joint Sealants; 2013.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- D. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- E. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- F. Qualification Data: For Installer.
- G. LEED Report: Submit VOC content documentation for all non-preformed sealants and primers.

1.5 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.6 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.7 WARRANTY

- A. See Section 01 78 00 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 which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Gunnable and Pourable Sealants:
 - 1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Dow Corning Corporation: www.dowcorning.com.
 - 4. Hilti, Inc: www.us.hilti.com.
 - 5. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
 - 6. Pecora Corporation: www.pecora.com.
 - 7. Red Devil: www.reddevil.com.
 - 8. Tremco Global Sealants: www.tremcosealants.com.
 - 9. Sherwin-Williams Company: www.sherwin-williams.com.
 - 10. W.R. Meadows, Inc: www.wrmeadows.com.
 - 11. GE Silicones.
- B. Preformed Compressible Foam Sealers:
 - 1. EMSEAL Joint Systems, Ltd: www.emseal.com.
 - 2. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
 - 3. Dayton Superior Corporation: www.daytonsuperior.com.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants:
 - 1. As selected by Architect from manufacturer's full range.
 - 2. Allow custom colors for masonry joints.
 - 3. Allow for four custom exterior custom colors including masonry joints.
- C. Comply with low-emitting requirements specified in Section 01 61 16.

2.3 SEALANTS

- A. Sealants and Primers General: Provide products having volatile organic compound (VOC) content as specified in Section 01 61 16.
- B. Type LS-1 General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
 - 1. Color: Standard colors matching finished surfaces.
- C. Type AS-1 Acoustical Sealant for Concealed Locations:
 - 1. Composition: Permanently tacky non-hardening butyl sealant.
 - 2. Applications: Use for concealed locations only:
 - a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
 - b. Sealant between acoustical ceiling perimeter track and wall.
- D. Single-Component Neutral- and Basic-Curing Silicone Sealant ES-1:
 - 1 Products:
 - a. Dow Corning Corporation; 790.
 - b. Tremco; Spectrem 1 (Basic).

- c. GE Silicones; SilPruf SCS2000.
- d. Pecora Corporation; 864.
- e. Polymeric Systems Inc.; PSI-641.
- f. Sonneborn, Division of ChemRex Inc.; Omniseal.
- 2. Type and Grade: S (single component) and NS (nonsag).
- 3. Class: 100/50.
- 4. Use Related to Exposure: NT (nontraffic).
- 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, and brick.
- 6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
- E. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant ES-2:
 - 1. Products:
 - a. Pecora Corporation; 898.
 - b. Tremco; Tremsil 600 White.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: color anodic aluminum aluminum coated with a high-performance coating galvanized steel and ceramic tile.
- F. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant ES-3:
 - 1. Products:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. GE Silicones; Sanitary SCS1700.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: color anodic aluminum, aluminum coated with a high-performance coating, and ceramic tile.
- G. Multicomponent Nonsag Urethane Sealant ES-4:
 - 1. Products:
 - a. Pecora Corporation; Dynatrol II.
 - b. Tremco; Dymeric 240/240FC.
 - c. Tremco; Vulkem 921.
 - 2. Type and Grade: M (multicomponent) and NS (nonsag).
 - 3. Class: 50.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, ceramic tile, and wood.
- H. Multicomponent Nonsag Urethane Sealant ES-5:
 - 1. Products:

- a. Sonneborn, Division of ChemRex Inc.; NP 2.
- b. Tremco; Vulkem 227.
- 2. Type and Grade: M (multicomponent) and NS (nonsag).
- 3. Class: 25.
- 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
- 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
- 6. Use O Joint Substrates: Color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, and brick.

2.4 PREFORMED JOINT SEALERS

- A. Type PS-1 Exterior Expansion Joint Sealer: Precompressed foam sealer; factory-applied and cured silicone facing.
 - 1. Face color: Coordinated with veneer; to be selected by Architect.
 - 2. Size as required to provide weathertight seal when installed.
 - 3. Provide product recommended by manufacturer for traffic-bearing use.
 - 4. Product: Colorseal manufactured by EMSEAL.
 - 5. Applications: Use for:
 - a. Exterior wall expansion joints.

2.5 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Secondary Joint Backing: Precompressed foam sealer; urethane with water-repellent.
 - 1. Size as required to provide weathertight seal when installed.
 - 2. Product: Backerseal manufactured by EMSEAL.
- E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.3 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. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- E. Install bond breaker where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.

3.4 CLEANING

A. Clean adjacent soiled surfaces.

3.5 PROTECTION

A. Protect sealants until cured.

3.6 SCHEDULE

- A. Joint-Sealant Application JS-1: Exterior vertical and horizontal nontraffic construction joints in cast-in-place concrete.
 - 1. Joint Sealant: ES-1 or ES-4.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- B. Joint-Sealant Application JS-2: Exterior horizontal traffic isolation and contraction joints in cast-in-place concrete slabs.
 - 1. Joint Sealant: ES-5.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- C. Joint-Sealant Application JS-3: Exterior vertical control and expansion joints in unit masonry.
 - 1. Joint Sealant: ES-1 or ES-4.
 - 2. Joint-Sealant Color: Maximum of four custom colors.
- D. Joint-Sealant Application JS-5: Exterior vertical joints between different materials listed above.
 - 1. Joint Sealant: ES-1 or ES-4.
 - 2. Joint-Sealant Color: Maximum of four custom colors.
- E. Joint-Sealant Application JS-6: Exterior perimeter joints between masonry and frames of doors, windows, and louvers.
 - 1. Joint Sealant: ES-1 or ES-4.
 - 2. Joint-Sealant Color: Maximum of four custom colors.
- F. Joint-Sealant Application JS-7: Vertical control and expansion joints on exposed interior surfaces of exterior walls.
 - 1. Joint Sealant: ES-4.
 - 2. Joint-Sealant Color: To be field painted.
- G. Joint-Sealant Application JS-8: Interior perimeter joints of exterior openings.
 - 1. Joint Sealant: ES-2 or ES-3.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- H. Joint-Sealant Application JS-9: Interior ceramic tile expansion, control, contraction, and isolation joints in horizontal traffic surfaces.
 - 1. Joint Sealant: ES-2 or ES-3.

- 2. Joint-Sealant Color: Maximum of two custom colors.
- I. Joint-Sealant Application JS-10: Interior joints between plumbing fixtures and adjoining walls, floors, and counters.
 - 1. Joint Sealant: ES-2 or ES-3.
 - 2. Joint-Sealant Color: White.
- J. Joint-Sealant Application JS-11: Vertical joints on exposed surfaces of interior unit masonry and concrete walls.
 - 1. Joint Sealant: ES-4.
 - 2. Joint-Sealant Color: To be field painted.
- K. Joint-Sealant Application JS-12: Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
 - 1. Joint Sealant: LS-1.
 - 2. Joint-Sealant Color: To be field painted.
- L. Joint-Sealant Application JS-13: Preformed exterior expansion joints without cover.
 - 1. Location: Where designated on drawings.
 - 2. Joint Sealant: PS-1, where indicated to produce a finished color.

SECTION 07 95 13 - EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Expansion joint cover assemblies for floor, wall, and ceiling surfaces.

1.2 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories: Placement of joint cover assembly frames in formwork.

1.3 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 B308/B308M Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2010.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices, available colors and finish, and
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, effected adjacent construction, anchorage locations, and _____.
- D. Samples: Submit two samples minimum 12 inch long, illustrating profile, dimension, color, and finish selected.
- E. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Architectural Art Mfg. Company.
 - 1. Floor-to-Floor Joint Systems: A Series, serrated type.
 - 2. Floor-to-Wall Joint Systems: A Series, serrated type.
 - 3. Wall-to-Wall Joint Systems: G Series, snap on type.
 - 4. Wall-to-Ceiling Joint Systems: C Series.
 - 5. Ceiling-to-Ceiling Joint Systems: C Series.

B. Balco, Inc.

- 1. Floor-to-Floor Joint Systems: 6000 Series, serrated type.
- 2. Floor-to-Wall Joint Systems: 6000 Series, serrated type.
- 3. Wall-to-Wall Joint Systems: WD/WDC Series.
- 4. Wall-to-Ceiling Joint Systems: 7500 Series.
- 5. Ceiling-to-Ceiling Joint Systems: 7500 Series.
- C. Construction Specialties, Inc: www.c-sgroup.com.
 - 1. Floor-to-Floor Joint Systems: ALS Series.

- 2. Floor-to-Wall Joint Systems: ALSW Series.
- 3. Wall-to-Wall Joint Systems: ASM Series.
- 4. Wall-to-Ceiling Joint Systems: Thinline Series; Type FCFC.
- 5. Ceiling-to-Ceiling Joint Systems: Thinline Series; Type FCF.

D. MM Systems Corp.:

- 1. Floor-to-Floor Joint Systems: Classic Cover Systems; type HFX.
- 2. Floor-to-Wall Joint Systems: Classic Cover Systems; type HFXE.
- 3. Wall-to-Wall Joint Systems: Model EX-K for flat and Model EX-L for corner.
- 4. Wall-to-Ceiling Joint Systems: Flexible Wall and Ceiling Series VSWL and VSGL.
- 5. Ceiling-to-Ceiling Joint Systems: Flexible Wall and Ceiling Series VSG.

2.2 EXPANSION JOINT COVER ASSEMBLIES

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

2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
 - 1. Exposed Finish Outdoors: Natural anodized.
 - 2. Exposed Finish at Floors: Mill finish or natural anodized.
 - 3. Exposed Finish at Walls and Ceilings: Natural anodized.

B. Resilient Seals:

- 1. For Ceilings: Any resilient material, flush, pleated, or hollow gasket.
- 2. Color: To be selected from manufacturers full line.
- C. Anchors and Fasteners: As recommended by cover manufacturer.
- D. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.
- E. Resilient Filler: Neoprene, exhibiting Shore A hardness of 40 to 50 Durometer.
- F. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

2.4 FABRICATION

- A. Joint Covers: Aluminum cover plate, aluminum frame construction, retainers with resilient elastomeric filler strip, designed to permit plus or minus 50 percent joint movement with full recovery, flush mounted.
- B. Back paint components in contact with cementitious materials.
- C. Shop assemble components and package with anchors and fittings.
- D. Provide joint components in single length wherever practical. Minimize site splicing.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Provide anchoring devices for installation and embedding under Section 03 10 00.
 - 1. Provide templates and rough-in measurements.

3.3 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.

3.4 PROTECTION

A. Do not permit traffic over unprotected floor joint surfaces.

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated steel doors and frames.
- B. Steel frames for wood doors.
- C. Fire-rated steel doors and frames.
- D. Thermally insulated steel doors.
- E. Steel glazing frames.

1.2 RELATED REQUIREMENTS

- A. Section 08 71 00 Door Hardware.
- B. Section 08 80 00 Glazing: Glass for doors and borrowed lites.

1.3 REFERENCE STANDARDS

- A. ANSI/SDI A250.8 Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- B. ANSI/SDI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- C. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- D. BHMA A156.115 American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- E. NAAMM HMMA 840 Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- F. NFPA 80 Standard for Fire Doors and Other Opening Protectives; 2016.
- G. UL (BMD) Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- H. UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 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; and one copy of referenced grade standard.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
- D. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Maintain at the project site a copy of all reference standards dealing with installation.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
- B. Steelcraft: www.steelcraft.com.
- C. Pioneer Industries.
- D. Security Metal Partitions Corporation.

2.2 DOORS AND FRAMES

- A. Requirements for All Doors and Frames:
 - 1. Door Top Closures: Flush with top of faces and edges.
 - 2. Door Edge Profile: Beveled on both edges.
 - 3. Door Texture: Smooth faces.
 - 4. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
 - 5. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
 - 6. Galvanizing for Exterior Units and Units in Wet Areas: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness
 - 7. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all 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.

2.3 STEEL DOORS

- A. Exterior Doors:
 - 1. Grade: ANSI/SDI A250.8 (SDI-100); Level 3 Extra Heavy-Duty, Physical Performance Level A, Model 2 Seamless.
 - 2. Core: Polyurethane.
 - 3. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
 - 4. Weatherstripping: Separate, see Section 08 71 00.
 - 5. Close to and bottom edges with galvanized, inverted steel channels; seal joints in top edges of doors against water penetration.
- B. Interior Doors, Non-Fire-Rated:
 - 1. Grade: ANSI/SDI A250.8 (SDI-100); Level 3 Extra Heavy-Duty, Physical Performance Level A, Model 2 Seamless.
- C. Interior Doors, Fire-Rated:

- 1. Grade: ANSI/SDI A250.8 (SDI-100); Level 3 Extra Heavy-Duty, Physical Performance Level A, Model 2 Seamless.
- 2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
 - a. Rate of Temperature Rise Across Door Thickness: 450 degrees F.
 - b. Provide units listed and labeled by UL (Underwriters Laboratories) UL (BMD).
 - c. Attach fire rating label to each fire rated unit.

2.4 STEEL FRAMES

A. General:

- 1. Comply with the requirements of grade specified for corresponding door, except:
 - a. ANSI/SDI A250.8 (SDI-100), Level 2 and 3 Door Frames: 14 gage, 0.067 inch, minimum thickness.
 - b. Frames for Wood Doors: Comply with frame requirements in accordance with ANSI/SDI A250.8 (SDI-100), Level 4, 14 gage, 0.067 inch, minimum thickness.
 - c. Frames for Sound-Rated Wood Doors: Comply with frame requirements in accordance with ANSI/SDI A250.8 (SDI-100), Level 4, 14 gage, 0.067 inch, minimum thickness.
- 2. Finish: Same as for door.
- 3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- 4. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
- B. Exterior Door Frames: Full profile welded, seamless.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
 - 2. Weatherstripping: Separate, see Section 08 71 00.
- C. Interior Door Frames, Non-Fire-Rated: Full profile welded type.
- D. Interior Door Frames, Fire-Rated: Full profile welded type.
 - 1. Fire Rating: Same as door, labeled.
- E. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.
- F. Mullions and Transom Bars: Join to adjacent members by welding.

2.5 FRAME ANCHORS

A. Jamb Anchors:

- 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
- 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.6 ACCESSORY MATERIALS

- A. Glazing: As specified in Section 08 80 00.
- B. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.
- C. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- D. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.
- E. Ceiling Struts: Minimum 1/4 inch thick by 1 inch wide steel.

2.7 FINISH MATERIALS

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.1 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.2 INSTALLATION

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
- B. In addition, install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Install door silencers in frames before grouting.
- E. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- F. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
- G. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
- H. Coordinate installation of hardware.
- I. Coordinate installation of glazing; install frames with removable glazing stops located on secure side of opening.
- J. Coordinate installation of electrical connections to electrical hardware items.
- K. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
- L. Touch up damaged factory finishes.
- M. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.

- b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
- c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
- d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
- 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- 3. Smoke-Control Doors: Install doors according to NFPA 105.

3.3 TOLERANCES

- A. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
- B. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall
- C. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
- D. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

3.4 ADJUSTING

- A. Adjust for smooth and balanced door movement.
- B. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- C. Remove grout and other bonding material from hollow metal work immediately after installation.
- D. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- E. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

A. Section 08 80 00 - Glazing.

1.3 REFERENCE STANDARDS

- A. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- B. ASTM E413 Classification for Rating Sound Insulation; 2010.
- C. AWI/AWMAC (QSI) Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- D. NFPA 80 Standard for Fire Doors and Other Opening Protectives; 2016.
- E. UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Specimen warranty.
- D. Test Reports: Show compliance with specified requirements for the following:
 - 1. Sound-retardant doors and frames; sealed panel tests are not acceptable.
- E. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing and louvers.
- F. Samples: Submit two samples of door veneer, 12 x 12 inch in size illustrating wood grain, stain color, and sheen.
- G. LEED Submittals:
 - 1. Certificates for Credit MR 7: Chain-of-custody certificates certifying that flush wood doors comply with forest certification requirements. Include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
 - 2. Include statement indicating costs for each certified wood product.
 - 3. Product Data for Credit EQ 4.4: For adhesives and composite wood products, documentation indicating that product contains no added urea formaldehyde.
- H. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

A. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.8 WARRANTY

- A. See Section 01 78 00 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

2.1 MANUFACTURERS

- A. Wood Veneer Faced Doors:
- B. Eggers Industries: www.eggersindustries.com.
- C. Marshfield DoorSystems, Inc: www.marshfielddoors.com.
- D. Algoma Hardwoods, Inc..
- E. Oshkosh Architectural Door Company.
- F. VT Industries, Inc.

2.2 DOORS

- A. All Doors: See drawings for locations and additional requirements.
 - 1. Quality Level: Custom Grade, in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300.
 - a. Grade A faces.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
 - 3. Faces are bonded to core using a hot press.
 - 4. Provide wood doors made from wood harvested from forests certified by an FSC-accredited certification body.
 - 5. Provide doors assembled with glues containing no added urea-formaldehyde.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at all locations.
 - 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. Sound Retardant Doors: Minimum STC of 42 or better, calculated in accordance with ASTM E413, tested in accordance with ASTM E90.
 - a. Provide doors specifically designed for sound transmission control with a high density core and damping.

- b. Refer to hardware specification for required hardware items.
- 4. Wood veneer facing with factory transparent finish.

2.3 DOOR AND PANEL 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.
- C. Sound Resistant Doors: Equivalent to Type particleboard core (PC) construction with core as required to achieve STC rating specified; plies and faces as indicated.

2.4 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: White Maple, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face; unless otherwise indicated.
 - 1. Vertical Edges: Any option allowed by quality standard for grade.
 - 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
 - 3. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 20 feet or more.

2.5 ACCESSORIES

A. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

2.6 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with Bonded Stiles and Rails:
 - 1. Provide solid blocks at lock edge for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- C. Fit door edge trim to edge of stiles after applying veneer facing.
- 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.

2.7 FACTORY FINISHING - WOOD VENEER DOORS

- A. Factory finish doors in accordance with specified quality standard:
 - 1. Transparent Finish: Transparent catalyzed polyurethane, Premium quality, TR-6, satin sheen.

PART 3 EXECUTION

3.1 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.

- 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.

3.2 TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.3 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

SECTION 08 31 00 - ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Access door and frame units, fire-rated, in wall locations.

1.2 REFERENCE STANDARDS

- A. ITS (DIR) Directory of Listed Products; current edition.
- B. UL (FRD) Fire Resistance Directory; current edition.

1.3 SUBMITTALS

- A. See Section 01 30 00 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 all access door units.

PART 2 PRODUCTS

2.1 ACCESS DOOR AND PANEL APPLICATIONS

2.2 MANUFACTURERS

- A. Babcock-Davis.
 - 1. Non-Rated: Cierra B-NT Series.
 - 2. Rated: Cierra B-IT Series.
- B. Karp Associates, Inc: www.karpinc.com.
- C. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.
- D. J. L. Industries, Inc. .
- E. Larsen's Manufacturing Company.
- F. Nystrom, Inc.
- G. Williams Bros. Corporation of America (The).

2.3 ACCESS DOORS AND PANELS

- A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.
- B. Units in Fire Rated Assemblies: Fire rating equivalent to the fire rated assembly in which they are to be installed.
 - 1. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.

2.4 ACCESS DOOR UNITS - WALLS AND CEILINGS

- A. Door and Frame Units: Formed steel.
 - 1. Door: Minimum 16 gage thick sheet metal, set flush with exposed face flange of frame.
 - 2. Frame: Minimum 16 gage thick sheet metal with 1 inch wide, surface-mounted trim.
 - 3. Hinges: Concealed pivot rod.
 - 4. Lock: Provide door panel with cylinder keyed to building masterkey program.

- B. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Formed steel.
 - 1. Fire-Resistance Rating: Not less than that of adjacent construction.
 - 2. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
 - 3. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 20 gage.
 - 4. Frame: Minimum 16 gage thick sheet metal with 1-inch wide, surface-mounted trim.
 - 5. Hinges: Concealed-pin type.
 - 6. Automatic Closer: Spring type.
 - 7. Lock: Self-latching device with cylinder lock.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings. Secure rigidly in place.
- C. Position units to provide convenient access to the concealed work requiring access.

SECTION 08 33 13 - COILING COUNTER DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-fire-rated coiling counter doors and operating hardware.

1.2 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish.
- C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.
- D. Samples: Submit two slats, 4 inches long illustrating shape, color and finish texture.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
- F. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.

1.4 WARRANTY

A. Warranty Period: Two years for defects in material and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Overhead Door Corporation; Series 657, www.ohd.com.
- B. C.H.I. Overhead Doors: www.chiohd.com.
- C. The Cookson Company: www.cooksondoor.com.

2.2 COILING COUNTER DOORS

- A. Coiling Counter Doors, Non-Fire-Rated: Stainless steel slat curtain.
 - 1. Mounting: Interior face mounted.
 - 2. Provide integral frame and sill of same material and finish.
 - 3. Nominal Slat Size: 1-1/4 inches wide.
 - 4. Slat Profile: Flat.
 - 5. Finish: No. 4.
 - 6. Guides: Formed track; same material and finish unless otherwise indicated.
 - 7. Hood: Manufacturer's standard.
 - 8. Operation: Manual push up operation.
 - 9. Interior latch only.

2.3 MATERIALS

A. Curtain Construction: Interlocking, single thickness 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 extruded stainless steel continuous channel or tubular shape to provide reinforcement and positive contact in closed position.
- 3. Stainless Steel Slats: ASTM A666, Type 304; minimum thickness 20 gage, 0.04 inch.
- B. Hood Enclosure: Internally reinforced to maintain rigidity and shape.
- C. Lock Hardware:
- D. Latching: Inside mounted, sliding deadbolt.
- E. Roller Shaft Counterbalance: Steel pipe and torsion 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.
- F. Integral Frame, Hood, and Fascia: Provide manufacturer's standard welded assemblies; fabricate of not less than 0.0625-inch-thick, stainless-steel sheet, Type 300 series, complying with ASTM A 240 or ASTM A 666.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 90 05.

3.3 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.4 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

SECTION 08 43 13 - ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Infill panels of metal.
- C. Aluminum doors and frames.
- D. Weatherstripping.
- E. Perimeter sealant.
- F. Frame mounted sun shades.

1.2 RELATED REQUIREMENTS

- A. Section 07 90 05 Joint Sealers: Perimeter sealant and back-up materials.
- B. Section 08 80 00 Glazing: Glass and glazing accessories.

1.3 REFERENCE STANDARDS

- A. AAMA CW-10 Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; 2009.
- C. AAMA 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- D. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- E. ASCE 7 Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- F. ASTM A36/A36M Standard Specification for Carbon Structural Steel; 2014.
- G. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- H. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- I. ASTM B209M Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.
- J. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- K. ASTM B221M Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- L. 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).
- M. SSPC-Paint 20 Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - 1. Design Wind Loads: Comply with requirements of IBC 2015 International Building Code.
 - 2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
- B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.
- D. Condensation Resistance Factor: CRF of not less than 57 (exterior frames) when measured in accordance with AAMA 1503.1.
- E. Thermal Resistance of Exterior Framing: Thermal transmittance U value not more than 0.38 BTU/HR/FT²/°F when measured in accordance with AAMA 1503.1.
- F. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 12 lbf/sq ft.
- G. 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.
- H. 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.

1.5 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, 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. Shop drawings must be prepared by the manufacturer under the supervision of a Professional Structural Engineer.
 - 2. Shop drawings must be signed and sealed by the supervising Professional Structural Engineer.
- D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations, including the impact of the frame mounted sunshades.
 - 1. Must be signed and sealed by the supervising Professional Structural Engineer.
- E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- F. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.

- G. LEED Submittals: Provide VOC content documentation for field-applied sealants and primers; comply with VOC content limits of Section 01 61 16.
- H. Report of field testing for water leakage.
- I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 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 at the State of Maryland.
- B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum five years of documented experience.

1.7 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.8 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.

1.9 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 78 00 Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a ten year period after Date of Substantial Completion.
- C. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: YKK AP America; Model YKK YES45XT for typical openings and YES60XT for CW5D at the Media Center. YKK YES45TU (4 inch mullion) at a operable windows with YES SSGTU Vent.
- B. Other Acceptable Manufacturers:
 - 1. EFCO, a Pella Company; www.efcocorp.com.
 - 2. Kawneer North America; www.kawneer.com.
 - 3. Oldcastle BuildingEnvelope; www.oldcastlebe.com.

2.2 STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Glazing Position: Centered (front to back).

- 2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep and 2 inches wide by 4 inches deep at operable units.
- 3. 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.
- 4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
- 5. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- 6. Sill Flashing: Provide manufacturers full height high performance sill flashing.

2.3 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, 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.
- B. Infill Panels (Types MWP1 and MWP2): Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
 - 1. Type MWP1:
 - a. Basis-of-Design: Mapes Sheild Panels; Mapes Industires, Inc., www.mapes.com.
 - h Finishes
 - 1) Exterior: Custom Kynar to match Storefront.
 - 2) Interior: Custom Kynar to match Storefront.
 - c. Panel Fabrication
 - 1) Exterior Substrate: Cement Board
 - 2) Impact Resistant Layer: Galvanized Steel
 - 3) Cores: Polystyrene
 - 4) Interior Substrate: Cement Board
 - 5) Tolerances .8% of panels dimension length and width (+/-) 1/16" thickness
 - 6) Overall Panel Thickness 1"
 - 7) R-Value 4.28
 - 8) U-Value 0.23
 - 2. Type MWP2:
 - a. Basis-of-Design: Mapes Shape Panels; Mapes Industires, Inc., www.mapes.com.
 - b. Finishes:
 - 1) Exterior: Custom Kynar to match Storefront.
 - 2) Interior: Custom Kynar to match Storefront.
 - c. Panel Fabrication
 - 1) Exterior Substrate: Cement Board
 - 2) Exterior Core: Polystyrene
 - 3) Smooth Mill Aluminum
 - 4) Secondary Exterior Substrate: Cement Board
 - 5) Interior Core: Polystyrene
 - 6) Interior Substrate: Cement Board
 - 7) Tolerances .8% of panels dimension length and width (+/-) 1/16" thickness
 - 8) Overall Panel Thickness: To be flush with face of framing.

- 9) R-Value 9.38
- 10) U-Value 0.11
- C. Swing Doors: Glazed aluminum.
 - 1. Thickness: 2 inches.
 - 2. Glazing Stops: Square.
- D. Horzontal Sun Louvers: Shop fabricated, shop finished, extruded aluminum vertical rails with horiztonal louvers.
 - 1. Basis-of-Design: Model 200-4 as manufactured by; Construction Specialties, Inc.; www.c-sgroup.com.
 - a. Components: All blades and outrigger components shall be 6063-T5 aluminum alloy.
 - b. Outriggers shall be 1/4" min, custom profile flat aluminum plate members 12" deep, as detailed on architectural drawings.
 - c. Blades shall be single piece 12" high, extruded aluminum airfoil design. Blades shall be factory assembled to outriggers using stainless steel, type F, thread cutting screws through internal screw slots in blades. Welding is not acceptable. Blades must be removable in case of damage. Fasteners to be hex head.
 - d. Sunshade system to attach to Welded Steel Tab by sunshade supplier.
 - e. All attachment hardware to steel tabs shall be designed/ engineered/ and supplied by the sunshade manufacturer. Coordinate attachment to storefront framing with storefront manufacturer. All hardware is to be stainless steel and designed to allow for expansion and contraction of sunshade assemblies.
 - 2. Finish:
 - a. 100% Fluoropolymer Resin Powder Coat System. Finish thickness to be 1.5 to 3.0 mils.
- E. Sun Shades: Shop fabricated, shop finished, extruded aluminum outriggers, louvers, and fascia, free of defects impairing strength, durability or appearance.
 - 1. Basis-of-Design: YKK; ThermaShade, other approved sunshades are as follows:
 - a. Kawneer; Versoleil SunShade.
 - b. EFCO; X-Therm E-Shade.
 - 2. Louver Type: 6" Airfoil.
 - 3. Outrigger Shape: Straight.
 - 4. Fascia: 3 1/2 inch square.
 - 5. Design Criteria: Design and fabricate to resist the same loads as storefront system as well as the following loads without failure, damage, or permanent deflection:
 - a. Snow: 30 psf; minimum.
 - b. Live: 30 psf; minimum.
 - c. Thermal Movement: Plus/minus 1/8 inch, maximum.
 - 6. Size: 24 inch projection.
 - 7. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.
- F. Vents: Provide project-out units.
 - 1. The windows shall be Architectural Aluminum Project Out windows in accordance with ANSI/AAMA/nwwda 101/I.S.2-97 or NAFS-1 Voluntary Specifications for Aluminum and Poly Prime Windows and Glass Doors for a Class and Grade of P-HC40 to P-HC70 for Project Out Windows.
 - a. Units submitted for laboratory testing shall be manufacturer's standard construction, glazed and assembled in accordance with manufacturer's specifications and ANSI/AAMA/nwwda 101/I.S.2-97 or NAFS-02.

- 2. Hinge: Concealed stainless steel four- or six-bar friction hinge; two per ventilator.
- 3. Lock: Manufacturer's cam lock and keeper.
- 4. Opening Limiter: Provide opening limiter on all operable vents, limiting size to be coordinated with Owner and Authorities Having Jurisdiction.
- 5. Finish to match framing system.
- 6. Basis-of-Design: YES SSGTU Vent by YKK AP America.
- 7. Insect Screens: Extruded aluminum frames, 6063-T5 alloy and temper, joined at corners; 18 x 16 mesh aluminum screen cloth; splines shall be extruded vinyl, removable to permit rescreening.
 - a. Frame Finish: To match aluminum window.
 - b. Screen Finish: Black anodized.

2.4 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, 14 gage, 0.064 inch minimum thickness; finish to match framing members.
- F. Concealed Flashings: 0.018 inch thick stainless steel.
- G. Perimeter Sealant: Type ES-1 or ES-4 specified in Section 07 90 05.
- H. Glass: As specified in Section 08 80 00.
- I. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- J. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.5 FINISHES

- A. Superior Performance Organic Coating System: AAMA 2605 three-coat, thermally cured polyvinylidene fluoride system; custom color to match approved sample as listed below:
 - 1. Up to four custom colors to be used in the following ratios:
 - a. Color 1: 70 Percent.
 - b. Color 2: 10 Percent.
 - c. Color 3: 10 Percent.
 - d. Color 4: 10 Percent.

2.6 HARDWARE

- A. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- B. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

2.7 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Construct with shear block system of assembly.

- D. Prepare components to receive anchor devices. Fabricate anchors.
- E. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- F. Arrange fasteners and attachments to conceal from view.
- G. Reinforce framing members for imposed loads.
- H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.1 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.

3.2 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. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Install operating sash.
- K. Set thresholds in bed of sealant and secure.
- L. Install hardware using templates provided.
- M. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
- N. Install perimeter sealant in accordance with Section 07 90 05.
- O. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

- A. Test installed storefront for water leakage in accordance with AAMA 501.2.
 - 1. Test a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect, before installation of interior finishes; test area may not show evidence of water penetration.

3.5 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.6 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. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

A. Protect installed products from damage during subsequent construction.

SECTION 08 44 10 - FIRE-RATED ALUMINUM CURTAIN WALL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fire-rated aluminum curtain wall including frame and glazing.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 2. ASTM E2010 Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 80: Standard for Fire Doors and Fire Windows.
 - 2. NFPA 257: Standard on Fire Test for Window and Glass Block Assemblies.
- C. Uniform Building Code (UBC):
 - 1. UBC-7-4: Methods for Fire Tests of Window Assemblies.
- D. Underwriters Laboratories, Inc. (UL):
 - 1. UL 9: Fire Tests of Window Assemblies.
 - 2. UL 263: Fire Tests of Building Construction and Materials
- E. American National Standards Institute (ANSI):
 - 1. ANSI Z97.1 Safety Glazing Materials Used in Buildings Safety Performance Specifications and Methods of Test.
- F. Consumer Product Safety Commission (CPSC):
 - 1. CPSC 16 CFR 1201 Categories I and II: Safety Standard for Glazing Materials.

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Fire Rating: 120 minutes.
 - 2. Certification: Windows shall be tested in accordance with ASTM E 2010, NFPA 252, UBC 7-4, UL263.
 - 3. Testing Laboratory: Fire tests shall be conducted by an approved independent testing laboratory, similar to Underwriter's Laboratories, Inc.

1.4 SUBMITTALS

- A. Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedure Section.
 - 1. Shop Drawings: Submit shop drawings showing layouts, profiles and product components.
 - 2. Samples: Submit samples for finishes, colors and textures.
 - 3. Technical Information: Submit latest edition of manufacturer's product data providing product description, technical data and installation instructions.

1.5 QUALITY ASSURANCE

A. Listings and Labels:

B. Fire rated framing and glazing shall be under current follow-up services by an approved independent agency and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- B. Delivery: Deliver materials to specified destination in manufacturer's packaging undamaged, complete with installation instructions.
- C. Storage and Protection: Store off ground, under cover, protected from weather, direct sunlight, construction activities and at temperature conditions recommended by manufacturer, +10°F to +110°F.
- D. Handling: Protect materials and finish during handling and installation to prevent damage.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

PART 2 - PRODUCTS

2.1 FIRE-RATED ALUMINUM FIXED WINDOWS

- A. Basis-of-Design Manufacturer: Aluflam North America, Curtainwalls; www.aluflam-usa.com.
- B. TGP Technical Glass Products, Curtainwall Serires; www.fireglass.com.

2.2 MATERIALS – ALUMINUM FRAMING

A. Frame construction: Integral structure, pressure plate, and cap from extruded aluminum profiles. Filled internally with cement composite material.

B. Dimensions:

Perimeter framing face dimension:
 Depth of vertical framing:
 Depth of horizontal framing:
 6-1/8 inch

- C. Assembly: Frame corners assembled with mechanical fasteners in factory or in the field.
- D. Sealing: Framing system shall insulate against effects of fire, smoke, and heat transfer from either side. Perimeter of the framing system to the rough opening shall be firmly packed with mineral wool insulation.

2.3 MATERIALS – FIRE RESISTANT GLAZING

- A. Assemblies shall be glazed with 120 minute rated 1-9/16" inch thick SGG Contraflam 120-N2 fire resistant glazing material as manufactured by Vetrotech Saint-Gobain www.vetrotechusa.com.
 - 1. Individual lites shall be permanently identified with a listing mark.
 - Glazing material installed in "Hazardous Locations" (subject to human impact) shall be certified to meet the applicable requirements for fire rated assemblies referenced in ANSI Z97.1 Standard for Safety Glazing Materials Used In Buildings and/or CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.

- 3. Visible daylight transmission shall be a minimum of 70%. Glazing material shall be optically clear, colorless and free from unusual distortion.
- B. Fire-rated glazing shall be insulated with $\frac{1}{2}$ " airgap and $\frac{1}{4}$ " low-E coated outboard glass lite. Installation conditions shall be analyzed to assure that fire-rated glazing is not exposed to temperatures outside the 10-110 degrees F limits.

2.4 MATERIALS – GLAZING AND ASSEMBLY ACCESSORIES

- A. Fasteners: All fasteners, setting pads, and glazing clips, shall be stainless or zinc-plated steel.
- B. Glazing Accessories: The glazing material perimeter shall be separated from the perimeter framing system with approved flame retardant intumescent glazing tape. Ceramic setting blocks shall be placed between the metal setting pads and the glazing material. Setting pads and blocks provided by manufacturer.

2.5 FABRICATION

- A. Curtainwall frames shall be furnished pre-assembled or K-D. Curtainwall assemblies shall be field glazed.
- B. Fabrication Dimensions: Fabricate to approved dimensions. The general contractor shall guarantee dimensions within required tolerance (+ 1/8"). Obtain approved shop drawings prior to fabrication.

2.6 FINISHES

- A. Superior Performance Organic Coating System: AAMA 2605 three-coat, thermally cured polyvinylidene fluoride system; custom color to match approved sample.
- B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Slight variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine area to receive curtainwall. Openings shall be plumb, square and within allowable tolerances. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Curtainwall installation shall be by a specialty contractor with appropriate experience qualifications; and in strict accordance with the approved shop drawings.

3.3 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Glass and frame should be cleaned using soft clean cloth, chamois leathers, sponges or soft paper. Use clean warm water with a mild detergent. Do not use detergent that contains either alkaline, acids or fluoride! Abrasive cleaning methods can damage surfaces! Clean prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

SECTION 08 44 13 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed curtain wall, with vision glazing and metal infill panels.
- B. Column covers.
- C. Perimeter sealant.
- D. Firestopping between curtain wall and edge of floor slab.
- E. Frame mounted sun shades.

1.2 PROJECT REQUIREMENTS

- A. Mullion depths must remain constrained to depths within 1/2-inch as indicated on Drawings; provide engineering and internal reinforcement as required to remain no greater than these constraints; coordinate allowed variation from Drawing depths with related trades.
- B. System to be factory prepared with the components factory cut for the Project; cutting within the installers shop will not be accepted. Contractor has the option of having the framing fully fabricated by the manufacturer for field glazing.

1.3 RELATED REQUIREMENTS

- A. Section 07 84 00 Firestopping: Firestop at system junction with structure.
- B. Section 07 90 05 Joint Sealers: Perimeter sealant and back-up materials.

1.4 REFERENCE STANDARDS

- A. AAMA CW-10 Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; 2009.
- C. AAMA 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- D. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- E. ASCE 7 Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- F. ASTM A36/A36M Standard Specification for Carbon Structural Steel; 2014.
- G. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- H. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- I. ASTM B209M Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.
- J. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- K. ASTM B221M Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

- L. ASTM C794 Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015.
- M. ASTM C1184 Standard Specification for Structural Silicone Sealants; 2014.
- 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. SSPC-Paint 20 Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.5 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand the following load requirements without damage or permanent set:
 - 1. Design Wind Loads: Comply with requirements of IBC 2015 International Building Code.
 - 2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, and maximum of 3/4 inch, with full recovery of glazing materials.
 - 3. Measure performance by testing in accordance with ASTM E 330, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
- B. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - 1. Movement of curtain wall relative to perimeter framing.
 - 2. Deflection of structural support framing, under permanent and dynamic loads.
- C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.
- D. Condensation Resistance Factor: CRF of 67 when measured in accordance with AAMA 1503.1.
- E. Thermal Resistance of Exterior Framing: Thermal transmittance U value not more than 0.38 BTU/HR/FT²/°F when measured in accordance with AAMA 1503.1.
- F. Water Leakage: None, when measured in accordance with ASTM E 331 at a test pressure difference of 15 lbf/sq ft.
- G. 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.
- H. 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.
- I. Design system to eliminate noises caused by wind and thermal movement, to prevent vibration harmonics, and to prevent "stack effect" in internal spaces.

1.6 SUBMITTALS

- A. See Section 01 30 00 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. Shop drawings must be prepared by the manufacturer, under the supervision of a Professional Structural Engineer.
 - 2. Shop drawings must be signed and sealed by the supervising Professional Structural Engineer.
- D. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- E. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations. Accommodate impact by attached sun shades in design.
 - 1. Engineering calculations ust be signed and sealed by the supervising Professional Structural Engineer.
- F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- G. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00
- H. LEED Submittals: Provide VOC content documentation for field-applied sealants and primers; comply with VOC content limits of Section 01 61 16.
- I. Field Quality Control Submittals: Report of field testing for water leakage.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 OUALITY 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 at the State of Maryland.
- B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum five years of documented experience.

1.8 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.10 FIELD CONDITIONS

- A. Contractor is responsible for coordination of dimensions and field measurements required by trade contractors.
- B. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.11 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 10 year period after Date of Substantial Completion.
- C. Provide 10 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.
- D. Warranty for all components must be direct from the manufacturer (non pass-through) and non pro-rated for the entire term.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: YKK AP America; Model YCW 750XT for typical openings and YES750XT with 8 1/4 inch back depth members for CW4.
- B. Other Acceptable Manufacturers:
 - 1. EFCO, a Pella Company; www.efcocorp.com.
 - 2. Kawneer North America; www.kawneer.com.
 - 3. Oldcastle BuildingEnvelope; www.oldcastlebe.com.

2.2 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Finish: High performance 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.
 - 2. 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.
 - 3. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 - 4. 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.
- B. Air Leakage: Maximum of 0.06 cu ft/min/sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 pounds per square foot pressure differential across assembly.
- C. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

2.3 COMPONENTS

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Outside glazed, with pressure plate and mullion cover.
 - 2. Include several profiles for exterior covers as indicated; no variation in snap cover design is permitted.

- B. 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.
- C. Glazing: As specified in Section 08 80 00.
- D. Infill Panels: Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
 - 1. Type MWP1:
 - a. Basis-of-Design: Mapes Sheild Panels; Mapes Industires, Inc., www.mapes.com.
 - b. Finishes:
 - 1) Exterior: Custom Kynar to match Storefront.
 - 2) Interior: Custom Kynar to match Storefront.
 - c. Panel Fabrication
 - 1) Exterior Substrate: Cement Board
 - 2) Impact Resistant Layer: Galvanized Steel
 - 3) Cores: Polystyrene
 - 4) Interior Substrate: Cement Board
 - 5) Tolerances .8% of panels dimension length and width (+/-) 1/16" thickness
 - 6) Overall Panel Thickness 1"
 - 7) R-Value 4.28
 - 8) U-Value 0.23
 - 2. Type MWP2:
 - a. Basis-of-Design: Mapes Shape Panels; Mapes Industires, Inc., www.mapes.com.
 - b. Finishes:
 - 1) Exterior: Custom Kynar to match Curtainwall.
 - 2) Interior: Custom Kynar to match Curtainwall.
 - c. Panel Fabrication
 - 1) Exterior Substrate: Cement Board
 - 2) Exterior Core: Polystyrene
 - 3) Smooth Mill Aluminum
 - 4) Secondary Exterior Substrate: Cement Board
 - 5) Interior Core: Polystyrene
 - 6) Interior Substrate: Cement Board
 - 7) Tolerances .8% of panels dimension length and width (+/-) 1/16" thickness
 - 8) Overall Panel Thickness: To be flush with face of framing.
 - 9) R-Value 9.38
 - 10) U-Value 0.11
- E. Sun Shades: Shop fabricated, shop finished, perforated vertical fin.
 - Locations: Clerestory Corridor, Gym and Vestibule and where indicated on the drawngs.
 - 2. Provide custom graphics at Gym and Vestibule fins; graphics to be provided by Architect.
- F. Operable Sash:
 - The windows shall be Architectural Aluminum Project Out in accordance with ANSI/AAMA/nwwda 101/I.s.2-97 or nafs-1 Voluntary Specifications for Aluminum and Poly Prime Windows and Glass Doors for a Class and Grade of P-HC40 to P-HC70 for Project Out Windows.

- a. Units submitted for laboratory testing shall be manufacturer's standard construction, glazed and assembled in accordance with manufacturer's specifications and ANSI/AAMA/nwwda 101/I.s.2-97 or nafs-02.
- b. Basis-of-Design: 562V (zero sightlines) by EFCO, a Pella Company.
- 2. Hinge: Concealed stainless steel four- or six-bar friction hinge; two per ventilator.
- 3. Lock: Key-operated concealed security lock and keeper.
- 4. Opening Limiter: Provide opening limiter on all operable vents, limiting size to be coordinated with Owner and Authorities Having Jurisdiction.
- 5. Finish to match framing system.
- 6. Insect Screens: Extruded aluminum frames, 6063-T5 alloy and temper, joined at corners; 18 x 16 mesh aluminum screen cloth; frames finished to match aluminum windows; splines shall be extruded vinyl, removable to permit rescreening.
- G. Column Covers: Aluminum, 14 gage, 0.064 inch minimum thickness, finish to match curtain wall framing members.

2.4 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. Structural Supporting Anchors Attached to Structural Steel: Design for bolted attachment.
- E. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- F. Exposed Flashings: 0.063 inch thick aluminum sheet; finish to match framing members.
- G. Concealed Flashings: 0.018 inch thick stainless steel.
- H. Firestopping: As specified in Section 07 84 00.
- I. Structural Glazing Adhesive: Silicone, neutral cure; formulated specifically for structural sealant glazing and complying with ASTM C1184.
 - 1. Ultraviolet radiation resistant for 2000 to 4000 micro-watts minimum for 21 days.
 - 2. Adhesion when subjected to ultraviolet radiation through glass in accordance with ASTM C794 without failure.
 - 3. Minimum adhesion tensile strength of 100 psi.
 - 4. Tested for compatibility with glazing accessories and weatherseal sealant.
 - 5. Adhesives applied within the building waterproofing envelope: Comply with low-emitting requirements specified in Section 01 61 16.
- J. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- K. Perimeter Sealant: Type ES-1 or ES-4 specified in Section 07900 and Section 01 61 16.
- L. Glazing: As specified in Section 08 80 00.
- M. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- N. Glazing Accessories: As specified in Section 08 80 00.
- O. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.5 FINISHES

A. Superior Performance Organic Coating System: AAMA 2605 3-coat, thermally cured polyvinylidene fluoride system; color as scheduled.

2.6 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E. Arrange fasteners and attachments to conceal from view.
- F. Reinforce framing members for imposed loads.
- G. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.1 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.

3.2 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. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- H. Install firestopping at each floor slab edge.
- I. Install operating sash.
- J. Pressure Plate Framing: Install glazing and infill panels in accordance with Section 08 80 00, using exterior dry glazing method.
- K. Install perimeter sealant in accordance with Section 07 90 05.
- L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 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.

3.4 FIELD QUALITY CONTROL

- A. Test installed curtain wall for water leakage in accordance with AAMA 501.2.
 - 1. Test a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect, before installation of interior finishes; test area may not show evidence of water penetration.
- B. Replace curtain wall components that have failed field testing and retest until performance is satisfactory.

3.5 ADJUSTING

A. Adjust operating sash for smooth operation.

3.6 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. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 45 13 - STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes curved translucent cellular-polycarbonate glazing panels, for canopy structure.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide translucent canopy panels capable of withstanding loads and thermal and structural movements indicated without failure. Failure includes the following:
 - 1. Deflection exceeding specified limits.
 - 2. Thermal stresses transferred to the building structure.
 - 3. Noise or vibration created by thermal and structural movement and wind.
 - 4. Loosening or weakening of fasteners, attachments, and other components.
- B. Structural Loads: Provide translucent canopy panels, including anchorage, capable of withstanding the effects of the following design loads when supporting full dead loads:
 - 1. Wind and Snow Loads: As indicated.
 - 2. Concentrated Load: 250 lb applied to framing members at location that produces the most severe stress or deflection.
- C. Structural Performance: Provide translucent canopy panels, including anchorage, capable of withstanding test pressure indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.
 - 1. Test Pressure: 150 percent of positive and negative wind-load design pressures.
 - 2. Test Duration: As required by design wind velocity; fastest 1 mile of wind for relevant exposure category.
- D. Thermal Movement: Provide translucent canopy panels that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, sealant failure, and other detrimental effects.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.
- E. Water Penetration: Provide translucent canopy panels that do not evidence water penetration when tested according to ASTM E 331 at a minimum differential static pressure of 20 percent of positive design wind load, but not less than 6.24 lbf/sq. ft.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions and profiles of components, and finishes for translucent canopy panels.
- B. Shop Drawings: For translucent canopy panels. Include plans, sections, details, and attachments to other Work.
- C. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer to assume engineering responsibility who has specialized in installing translucent canopy panels similar to those indicated for this Project and who is acceptable to manufacturer.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of translucent canopy panels and are based on the specific system indicated. Other manufacturers' translucent canopy panels with equal performance characteristics may be considered.

1.5 PROJECT CONDITIONS

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

1.6 WARRANTY

- A. Translucent Canopy Panels Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of translucent canopy panels that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Failure of canopy panels to meet performance requirements.
 - 2. Deterioration of polycarbonate panels and other materials beyond normal weathering.
 - 3. Water leakage; defined as uncontrolled water appearing on normally exposed interior surfaces of canopy panels from sources other than condensation. Water controlled by flashing and gutters and drained back to the exterior and that cannot damage adjacent materials or finishes is not water leakage.
 - 4. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide the following product or an approved substitute:
 - 1. Basis-of-Design: Pentaglas 12 System; CPI International.
 - 2. Approved Equal.

2.2 GLAZING MATERIALS

- A. Cellular-Polycarbonate Panels: Single layer polycarbonate sheet with three-layer cellular cross section that provides isolated airspaces. Panels installed in continuous lengths without transverse connections. Provide panels with upstands at 90 degrees to the panel face that are integral to the panel. Provide dry-glazed connection between panels without gaskets or sealant.
 - 1 Panel Width: Nominal 2'-0"
 - 2. Panel Thickness: 0.47 inches.
 - 3. Panel Type: "RPH" by CPI International with 1'-0" overhang.
 - 4. Panel Color: As selected by Architect from manufacturer's full range of colors.
 - 5. Color Stability: Not more than 3.0 CIE Lab Units change when tested according to ASTM D2244.
 - 6. Panel Framing: Extruded aluminum rafters and purlins with factory baked enamel finish.
 - 7. Framing Color: Fluoropolymer two-coat system; match Architect's sample.
- B. Glazing Gaskets: Manufacturer's standard pressure-glazing gaskets of elastomer type and hardness selected by skylight and gasket manufacturers to comply with requirements. Provide gasket assemblies that have corners sealed with sealant recommended by gasket manufacturer.
- C. Subframing and Connections: Provide all subframing, channels, clips, and hardware required to attach system to canopy structure in configuration indicated on the drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting canopy performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing translucent panel components.
 - 1. Fit frame joints to produce hairline joints free of burrs and distortion.
 - 2. Rigidly secure nonmovement joints.
 - 3. Accommodate thermal and mechanical movements.
 - 4. Install framing components to drain water passing joints and to drain condensation and moisture occurring or migrating within canopy panels to the exterior.
 - 5. Coordinate installation of flashings at canopy perimeters to maintain continuity of thermal and water barriers.
- B. Erection Tolerances: Install skylight components true in plane, accurately aligned, and without warp or rack. Adjust framing to comply with the following tolerances:
 - 1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 10 feet; 1/4 inch over total length.
 - 2. Alignment: Where surfaces abut in line and at corners and where surfaces are separated by less than 3 inches, limit offset from true alignment to less than 1/32 inch; otherwise, limit offset from true alignment to 1/8 inch.

3.3 CLEANING

A. Clean canopy system inside and outside, immediately after installation and after sealants have cured, according to manufacturer's written recommendations. Remove temporary protective coverings and strippable coatings from prefinished metal surfaces. Remove labels and markings from all components.

END OF SECTION

SECTION 08 62 70 - TUBULAR SKYLIGHTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings as Type 1 and Type 2.
- B. Accessories.

1.2 REFERENCES

- A. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM A 463 Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process.
- C. ASTM A 653 Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process.
- D. ASTM E 283 Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- E. ASTM E 308 Standard Practice for Computing the Colors of Objects by Using the CIE System.
- F. ASTM E 330 Structural Performance of Exterior Windows, Curtain Walls and Doors.
- G. ASTM E 547 Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference.
- H. ASTM D 635 Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position.
- I. ASTM D-1929 Test Method for Ignition Properties of Plastics.
- J. UL 181 Factory Made Air Ducts and Air Connectors.
- K. UL 790 Standard for Tests for Fire Resistance of Roof Covering Materials.
- L. ICBO/ICC AC-16 Acceptance Criteria for Plastic Skylights.

1.3 PERFORMANCE REQUIREMENTS

- A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
 - 1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
 - 2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.
 - 3. Uniform Load Test:
 - a. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf or Negative Load of 70 psf.
 - b. All units shall be tested with a safety factor of 3 for positive pressure and 2 for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
 - 4. Fire Testing
 - a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.

- b. Self-Ignition Temperature Greater than 650 degrees F Per: U.B.C. Standard 26-6. See ASTM D-1929.
- Smoke Density Rating no greater than 450 Per U.B.C. 8-1 (See ASTM Standard E 84) in way intended for use. Classification C.
- d. Rate of Burn and/or Extent Maximum Burning Rate: 2.5 inches/min Classification CC-2: U.B.C. Standard 26-7. See ASTM D 635.
- e. Rate of Burn and/or Extent Maximum Burn Extent: 1 inch (25 mm) Classification CC-1: U.B.C. Standard 26-7. See ASTM D 635.
- 5. Thermal Performance:
 - a. U-Factor: 0.47.
 - b. R-Value: Minimum of 2.0.
 - c. SHGC: 0.20.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- 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. Installation methods.
 - 4. Operation and Maintenance Manuals.
- C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.
- D. Verification Samples: As requested by Architect.
- E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.
- F. LEED Submittal: Credit EQ 4.1: Manufacturer's product data for field-applied sealants and sealant primers in compliance with Section 01 61 16.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.6 PROJECT CONDITIONS

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

1.7 WARRANTY

A. Daylighting Device: Manufacturer's standard warranty for 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Solatube International, Inc: www.solatube.com
- B. ODL, Inc.
- C. All Canadian Tubular Skylight.

2.2 TUBULAR DAYLIGHTING DEVICES

- A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.
- B. SkyVault Series: Solatube Model M74 DS O Open Ceiling, 28.5 inch (724 mm) Daylighting System:
 - 1. Daylight Collector Type C (Type 1 Only) with key components consisting of:
 - a. Collector Dome: Polycarbonate 0.125 inch (3.2 mm) minimum thickness classified as CC1 material; UV inhibiting; (100 percent UVC, 100 percent UVB and 98.8 percent of the range of UVA transmission). Dimensions: 31.5 inches (800 mm) diameter by 6 inches (152 mm) high.
 - b. Collector Cylinder: Polycarbonate 0.093 inch (2.4 mm) minimum thickness, classified as CC1 material; UV inhibiting, blocks all radiation <380nm: 100 percent UVC, 100 percent UVB and 76 percent of the range of UVA transmission). Dimensions: Dimensions 35.88 inches (911 mm) high by 51.5 inches (1308 mm) arc length.
 - c. Collector Cylinder Back Panel: Support for collector assembly. Fabricated of corrosion resistant zincalum steel sheet CS-B AZ50, conforming to ASTM A792/A 792M, with a thickness of 0.0276 inch (0.7 mm). Dimensions: 36 inches (914 mm) high by 48 inches (1219 mm) arc length.
 - d. Collector Cylinder LightTracker Reflector: Daylight reflector. Aluminum sheet, thickness 0.018 inch (0.5 mm). Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields specular reflectance greater than 99 percent for the Visible Light spectrum (400 nm to 760 nm) and less than 20% reflectance for Infrared (IR) wavelengths longer than 980nm, resulting in a spectrally-selective Total Solar Spectrum (400 nm to 2500 nm) less than 80.2 percent. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308. Dimensions: 36 inches (914 mm) high by 48 inches (1219 mm) arc length.
 - e. Micro-replicated Raybender HD Fresnel Lens: Daylight collecting lens. Impact resistant acrylic, 0.020 inch (0.51 mm) thick film with linear prism lens structure, classified as CC2 material. Dimension: 16 inch (406 mm) high by 51.75 inch (1314 mm) arc length.
 - f. Cylinder Collector Stanchion: "U" shaped support connecting the dome ring to the base cone assembly; (2) each. Fabricated of corrosion resistant galvanized steel sheet (G90), conforming to ASTM A 653/A 653M, with a thickness of 0.052 inch (1.3 mm). Dimensions: 36 inches (914) high by 0.50 inches (12.7 mm) wide by 0.375 inches (9.5 mm) deep.
 - g. Base Cone Assembly: Conical shaped support connecting the daylight collection system to the curb-cap of associated TDD unit. Fabricated of corrosion resistant stainless steel (302/304), conforming to ASTM A 463/A 463M, with a thickness of 0.034 inch (0.86 mm). Dimensions: 35.9 inches (912 mm) major diameter by 30.385 inches (772 mm) minor diameter by 2.28 inches (58 mm) high.
 - h. Upper seal (M74 DS Type C): Outer Dome, Cylinder Dome, and Back Panel interface. Adhesive backed PU foam "D" profile with water resistant polymeric skin. Dimension: 0.375 inch (9.5 mm) wide by 0.25 inch (6.35 mm) high.

- i. Lower seal (M74 DS Type C): Outer Dome and Support Cone interface. Adhesive backed 45 degree angle pile weather-strip. Dimension: 0.670 inch (17 mm) high by 0.27 inch (6.85mm) wide.
- C. Roof Dome Assembly (Type 1 and Type 2): Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
 - 1. Fasteners: Non-corrosive metal fasteners including: non-magnetic stainless steel, zinc plated steel, aluminum, or injection molded nylon.
 - a. Outer Dome Glazing: Type DP, 0.125 inch (3.2 mm) minimum thickness, vacuum formed polycarbonate classified as CC1 material; UV inhibiting (100 percent UVC, 100 percent UVB and 98.8 percent of the range of UVA transmission).
 - 1) Outer Dome Seals: Adhesive Back Closed Cell Foam Seal 0.25 inch (6.3 mm) tall by 0.75 inch (19 mm) wide.
 - 2) Seals: Dome Assembly Seal: Adhesive backed pile weather-strip, 0.350 inch (8.9 mm) tall by 0.187 inch (4.8 mm) wide.
 - 2. Security Guard: Type SG, welded powder coated steel or stainless steel rods 1/8 inch diameter mounted with an 8 inch maximum cross section. Assembly fastened with 1/8 inch diameter blind rivets in 6 locations to Curb-Cap assembly.
 - 3. Curb Cap Flashing Base: One piece, seamless, leak-proof flashing and base support for dome and top of tube and cap flashing. Fabricated of galvanized steel, conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A792/A 792M, with a thickness of 0.0276 inch (0.7 mm) plus or minus .004 inch (.01 mm).
 - a. Base Style: Type FC, Curb-cap, with inside dimensions of 35.5 inches by 35.5 inches (905 mm by 905 mm) to cover curb specified in Section 07600.
 - b. Insulation: Nominal 1 inch thick thermal isolation pad to reduce thermal conduction between curb-cap and tubing and thermal convection between room air and curb-cap. Rated R-6 (OFxft2xhr/Btu) Insulation is Polyisocyanurate foam utilizing CFC, HCFC, & HFC free blowing agent. Type-1 Class-1 per ASTM C 1289; Passes UL 1715 (15-minute thermal barrier per IBC 2603.4); Attic ventilation may be required per IBC 1203.2.
 - c. Curb Seal: Includes a double bead of adhesive backed closed cell foam seal 0.188 inch (4.8mm) tall by 0.375 inch (9.5mm) wide to reduce air infiltration.
 - 4. Dome Edge Protection Band: For Classified Roof Assemblies, curb height (by others or built on site) must be more than 8 inches (203 mm). Galvanized steel. Nominal thickness of 0.039 inch (1 mm).
 - 5. Tube Collar: Attached to top of curb-cap section; 0.018 inch (0.45 mm) nominal thickness aluminum conforming to ASTM B 209.
 - a. Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields specular reflectance greater than 99 percent for the Visible Light spectrum (400 nm to 760 nm) and less than 20% reflectance for Infrared (IR) wavelengths longer than 980nm, resulting in a spectrally-selective Total Solar Spectrum (400 nm to 2500 nm) less than 80.2 percent.
 - b. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
 - 6. Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm) conforming to ASTM B 209 with Tab-Lock tube joint structural connection system.
 - a. Extension Tubes:
 - 1) Reflective extension tube, 24 inches (610 mm) or 48 inches (1220 mm) long.

- 2) Belt Alignment Tab aligns Tube Belt on to tube in the correct location.
- 3) Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields specular reflectance greater than 99 percent for the Visible Light spectrum (400 nm to 760 nm) and less than 20% reflectance for Infrared (IR) wavelengths longer than 980nm, resulting in a spectrally-selective Total Solar Spectrum (400 nm to 2500 nm) less than 80.2 percent.
- 4) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.

b. Tab-Lock

- 1) Tab-Lock captures adjoining tube or tube connector using periodic opposing hooks integrated in the tube perimeter with mating retention detents.
- 2) Hook system allows ease of tube engagement or disengagement for single operator from man-lift or rooftop.
- 3) System intertwines the ends of the adjoining tubes and tube connectors between each Tab-Lock station.
- 4) Intertwining function accepts tubes and connectors of common diameters which reduces light loss up to 2 percent per tube joint relative to tubes with 0.3 inch (7.6 mm) diameter difference.

c. Tube Belt:

- 1) Sheet-metal belt 2 inch (50.8 mm) wide by 28.5 inch (724 mm) nominal diameter by 0.022 inch (0.5 mm) thick CS-B AZ-50 ASTM A 792 with 0.10 inch (2.5mm) diameter stainless steel type 302 ASTM A 313 torsion spring actuated toggle clamp.
- 2) Retains Tab-Lock tube joint structural connection system; stiffens linear tube assembly; and prevents tube rotation or disengagement under normal use.
- 3) Includes locking tab to prevent unintentional Tube Belt Latch opening due to handling, service, vibration, or normal operation or use.
- 4) Diffuser Assemblies (Open Ceiling): Solatube Model M74 DS-O. 28.5 inch (724 mm) diameter diffuser attached directly to bottom of tube (Type: B).

7. Diffuser at drywall ceilings (Type 2 Only):

- a. Diffuser Collar: Attached to diffuser lens; 0.018 inch (0.45 mm) nominal thickness aluminum.
 - Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields specular reflectance greater than 99 percent for the Visible Light spectrum (400 nm to 760 nm) and less than 20% reflectance for Infrared (IR) wavelengths longer than 980nm, resulting in a spectrally-selective Total Solar Spectrum (400 nm to 2500 nm) less than 80.2 percent.
 - 2) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
- b. Lens: Type L2, Prismatic lens designed to maximize light output and diffusion. Visible Light Transmission shall be greater than 90 percent at 0.100 inch (2.5 mm) thick. Classified as CC2.
- c. Diffuser Seal: "L" shaped EPDM closed cell foam, 0.86 in (21.8 mm) wide by 1.37 in (34.8mm) tall by 0.16 in (4.1 mm) thick to minimize condensation and bug, dirt and air infiltration per ASTM E 283.

- 8. Amplifier Type: A (Type 1 and Type 2): 36 inch (914 mm) diameter amplifier diffuser attached directly to bottom of tube.
 - a. Amplifier: Type A, Conical shaped assembly 23.7 inches (602 mm) tall, 28.5 inches (724 mm) upper diameter, and 36 inches (914 mm) lower diameter.
 - 1) Amplifier collimates incident light. Light reflects off 2 successively angled facets designed to mix the light to reduce glare and to correct the incident angle by 15 degrees and 25 degrees successively thereby improving the transmission efficiency through the diffuser lens by reducing retro-reflection due to first surface refraction and concentrating the distribution of light by reducing the cone of illumination relative to the incident angle correction.
 - 2) Tube Connect Slots at upper perimeter receive 6 Tab-Lock Hook features from adjoining tube for mechanical tube engagement.
 - 3) Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields specular reflectance greater than 99 percent for the Visible Light spectrum (400 nm to 760 nm) and less than 20% reflectance for Infrared (IR) wavelengths longer than 980nm, resulting in a spectrally-selective Total Solar Spectrum (400 nm to 2500 nm) less than 80.2 percent.
 - 4) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
 - b. Lens: Type L2, Prismatic lens designed to maximize light output and diffusion. Visible Light Transmission shall be greater than 90 percent at 0.100 inch (2.5 mm) thick. Classified as CC2.
 - c. Diffuser Seal: "L" shaped EPDM closed cell foam, , 0.86 in (21.8 mm) wide by 1.37 in (34.8mm) tall by 0.16 in (4.1 mm) thick to minimize condensation and bug, dirt and air infiltration per ASTM E 283.
 - d. Amplifier Diffuser Collar: Attached to diffuser lens; 0.018 inch (0.45 mm) nominal thickness aluminum.
 - Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Spectrally-selective optical surface yields specular reflectance greater than 99 percent for the Visible Light spectrum (400 nm to 760 nm) and less than 20% reflectance for Infrared (IR) wavelengths longer than 980nm, resulting in a spectrally-selective Total Solar Spectrum (400 nm to 2500 nm) less than 80.2 percent.
 - 2) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
 - e. Amplifier Diffuser Belt:
 - Sheet-metal belt 2 inch (50.8 mm) wide by 36 inch (914mm) nominal diameter by 0.022 inch (0.5 mm) thick CS-B AZ-50 ASTM A792 with 0.10 inch (2.5 mm) diameter stainless steel Type 302 ASTM A 313 torsion spring actuated toggle clamp.
 - 2) Retains Tab-Lock tube joint structural connection system; stiffens linear tube assembly; and prevents tube rotation or disengagement under normal use.
 - 3) Includes locking tab to prevent unintentional Latch opening due to handling, service, vibration, or normal operation or use.

- f. Diffuser Seal: "L" shaped EPDM closed cell foam, , 0.86 in (21.8 mm) wide by 1.37 in (34.8mm) tall by 0.16 in (4.1 mm) thick to minimize condensation and bug, dirt and air infiltration per ASTM E 283.
- 9. Accessories (Type 1 and Type 2):
 - a. Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.
 - b. Local Dimmer Control: Provided with dimmer switch and cable.
 - 1) Daylight Dimmer: Electro-mechanically actuated daylight valve; for universal input voltages ranging between 90 and 277 V at 50 or 60 Hz; maximum current draw of 50 ma per unit; controlled by low voltage, series Type T02: circuited, 4 conductor, size 22 cable; providing daylight output between 2 and 100 percent. Provided with dimmer switch and cable.
 - 2) Switch: Manufacturer-specific low voltage DC DP/DT switch (white) required to operate Daylight Dimmer. Note: only one switch is required per set of synchronously controlled dimmers.
 - 3) Cable: Two conductor low voltage cable (500 ft.) for multiple unit DC connection.

10. Thermal Performance:.

- a. Thermal Insulation Panel with Integral 24" (610 mm) Extension Tube: Type TIP, high-performance dual-glazed, thermally-broken tube insulation system consisting of two acrylic panels, spaced 1.0 inch (25.4mm) apart, classified CC2 Class C material, 0.110 inch (2.8 mm) thick, housed in a polyethylene terephthalate glycol-modified (PETG) or acrylonitrile butadiene styrene (ABS) band classified as CC2 material 0.060 inch (1.5 mm) thick by 1.75 inch (44.5 mm) high with Spectralight Infinity high reflectance specular finish interior surface, and assembled with stainless steel disk spacers 0.0197 inch (0.5 mm) thick and aluminum rivets 0.13 inch (3.2 mm) fastened periodically around the perimeter. Dual-glazed Panel assembly integrated with a 12" Upper and a 12" Lower Transition Tube made of Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance to form a nominal 24.9 inch (633mm) tube assembly with integrated Tab-Lock connections.
- b. Required for 2015 IECC Energy Code compliance.

2.3 ACCESSORIES

- A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
- B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
- C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.
 - 1. Sealants and Sealant Primers applied within the building waterproofing envelope: Comply with Section 01 61 16.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, or Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

3.4 PROTECTION

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

END OF SECTION

SECTION 08 63 00 - METAL-FRAMED SKYLIGHTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum skylight framing system.
- B. Skylight glazing.
- C. Fasteners, anchors, reinforcement, and flashings.

1.2 REFERENCE STANDARDS

A. American Architectural Manufacturers Association:

- 1. AAMA 501.1 Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure; 2005.
- 2. AAMA 501.2 Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; 2009.
- 3. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- 4. AAMA 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

B. ASTM International:

- 1. ASTM A36/A36M Standard Specification for Carbon Structural Steel; 2014.
- 2. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- 3. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- 4. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- 5. ASTM B209M Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.
- 6. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- 7. ASTM B221M Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- 8. ASTM C794 Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015.
- 9. ASTM C794 Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
- 10. ASTM C920 Standard Specification for Elastomeric Joint Sealants; 2014.
- 11. ASTM C1401 Standard Guide for Structural Glazing.
- 12. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).
- 13. ASTM D2240 Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- 14. ASTM D4479/D4479M Standard Specification for Asphalt Roof Coatings Asbestos-Free; 2007 (Reapproved 2012).
- 15. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

- 16. 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.
- C. Aluminum Association:
 - 1. AA DAF-45 Designation System for Aluminum Finishes.
- D. American Society of Civil Engineers (ASCE):
 - 1. SEI/ASCE 7-02 Minimum Design Loads for Buildings and Other Structures.
- E. Federal Specification Unit:
 - 1. FS TT-C-494 Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- F. Comply with the International Building Code and ASCE 7-98.
- G. Factory Mutual.

1.3 DESIGN REQUIREMENTS

- A. Comply with the International Building Code 2006 and ASCE 7-98 or where required by this Section, exceed the code. Nothing in this Section shall be construed as allowing or requiring noncompliance with code.
- B. System Design: Design and size components to withstand the following load requirements as measured in accordance with ASTM E330:
 - 1. Roof Snow Load: 30 lbf/sq ft + Drifting Effects.
 - 2. Positive and Negative Wind Load: Comply with the International Building Code and ASCE 7-98.
 - 3. Concentrated load at any location on framing: 250 lb.
- C. Deflection: Design and size components for maximum allowable deflection of glazing support member of 1/175 of span or a maximum of 1 inch.
- D. Movement: Design system to limit stress on elastomeric sealants to 20 percent of tested tensile adhesion and maximum compression or elongation to 25 percent of neutral dimension.
- E. Expansion/Contraction: Design system to accommodate thermal expansion and contraction over ambient temperature range of minus (-) 30 degrees F and exterior metal temperature of 180 degrees F for dark colors or 150 degrees F for light colors; interior temperature range of 55 degrees F and 100 degrees F; dynamic loading and release of loads, and deflection of structural support framing without damage to skylight system components or loss of weathertightness.
- F. Thermal Resistance of Assembly: Maximum U Value of 0.45 Btu/sq ft per hour per deg F when measured in accordance with AAMA 1503.
- G. Limit air infiltration through assembly to 0.06 cu ft/min/sq ft for glazed area, measured at reference differential pressure across assembly of 6.24 psf in accordance with ASTM E283.
- H. Water Leakage: None, when measured in accordance with ASTM E331 at static pressure of 6.24 lbf/sq ft.
- I. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.
- J. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by metal-framed skylight assemblies without failing adhesively or cohesively. Sealant fails cohesively before sealant releases from substrate when tested for adhesive compatibility with each substrate and joint condition required.

- 1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
- 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications, standard details, and installation requirements.
- C. Shop Drawings: Include required sets prepared by or under the supervision of a professional engineer licensed in the State of Maryland. Indicate framed opening requirements and tolerances, spacing of all members, framing member profiles, anticipated deflection under load, affected related Work, expansion and contraction joint locations and details, and identify shop and field welds by AWS Welding Symbols, A2.0.
- D. Samples: Submit two samples, not less than 12 by 12 inch in size illustrating appearance of prefinished aluminum and specified glazing system, including glazed edge and corner.
- E. Test Reports: Indicate substantiating engineering data, test reports of previous testing of similar assemblies meeting performance criteria, and other supporting data.
- F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations.
- G. Structural Glazing Adhesive: Submit product data and calculations showing compliance with performance requirements.
- H. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- I. Field Quality Control Submittals: Report of field testing for water leakage.
- J. Manufacturer's Installation Instructions: Indicate special procedures, safety precautions, and perimeter conditions requiring special attention.
- K. Compatibility Test Reports: For structural-sealant-glazed skylights, preconstruction test reports from structural- and nonstructural-sealant manufacturer indicating that materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results for sealant performance and written recommendations for primers and substrate preparation needed for adhesion.
- L. Preconstruction Testing Program: For metal-framed skylight assemblies, developed specifically for Project.
- M. Structural-Sealant-Glazing, Quality-Control Program: Developed specifically for Project.
- N. Structural-Sealant-Glazing, Quality-Control Program Reports: Documenting quality-control procedures and verifying results for metal-framed skylights.
- O. Field quality-control test and inspection reports.

1.5 QUALIFICATIONS

A. Designer Qualifications: Design skylight system under direct supervision of a professional structural engineer experienced in design of work of the type specified in this section and licensed in the State of Maryland.

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not fewer than five years of documented experience.
- C. Installer Qualifications: Company specializing in performing the type of work specified in this section with not fewer than five years of documented experience.

1.6 QUALITY ASSURANCE

- A. Compatibility Testing: For structural-sealant-glazed skylights, perform structural- and nonstructural-sealant manufacturer's standard preconstruction tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by metal-framed skylights.
 - 1. Test a minimum of five samples of each metal, glazing, and other material.
 - 2. Prepare samples using techniques and primers required for installed skylights.
 - 3. For materials that fail tests, determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.
- B. Structural-Sealant Glazing: Comply with recommendations in ASTM C 1401, "Guide for Structural Sealant Glazing," for joint design and quality-control procedures.
 - 1. Joint designs are reviewed and approved by structural-sealant manufacturer.
 - 2. Quality-control program development and reporting are Project specific and comply with ASTM C 1401 recommendations for material qualification procedures, preconstruction sealant-testing program, and procedures and intervals for fabrication and installation reviews and checks.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Provide wrapping to protect prefinished aluminum surfaces. Do not use adhesive papers or spray coatings that bond when exposed to sunlight or weather.

1.8 FIELD MEASUREMNTS

A. A. Verify field measurements prior to fabrication.

1.9 COORDINATION

- A. Coordinate the Work with installation of roofing system and structural curb.
- B. Coordinate the Work with continuity of vapor barrier.

1.10 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of automatic entrance door assemblies that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
 - 2. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Thermal movements.
 - c. Movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - d. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.

- e. Noise or vibration created by wind and thermal and structural movements.
- f. Loosening or weakening of fasteners, attachments, and other components.
- g. Sealant (including structural silicone) loss of adhesion, loss of cohesion, cracking or discoloration.
- h. Glass Breakage Including: Secondary breakage caused by falling glass; spontaneous breakage of heat treated glass.
- i. Failure of insulating glass edge seal as evidenced by frost, condensation, water, dust, corrosion or reflective coating damage within sealed air space.
- j. Insulating glass spacer migration.
- k. Delamination or discoloration of laminated glass or panels.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. A. Basis-of-Design Product: The design for metal framed skylights is based on Total Flush Glazed System by Super Sky Products, Inc. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. Oldcastle Building Envelope: www.oldcastlebe.com.
 - 2. Super Sky Products Enterprises, LLC: www.supersky.com.
 - 3. Architectural Skylight Co., Inc.
 - 4. CPI
 - 5. Fisher Skylights Inc.
 - 6. Imperial Glass Structures.
 - 7. LinEl Signature.

2.2 SKYLIGHT COMPONENTS

- A. Frame: Extruded aluminum structural members with integral condensation collection and guttering system thermally separated from exterior metal components. Give preference to products having recycled content.
- B. Glazing System: Four-sided structural adhesive glazed, factory-installed.
- C. Glazing: Insulating glass.

2.3 MATERIALS

- A. Aluminum Extrusions: Alloy 6063-T5, 6063-T6, or 6061-T6 members complying with ASTM B221 (ASTM B221M), with minimum thickness 1/8 inch for structural members and 1/16 inch for non-structural members.
- B. Formed Aluminum: Sheet material of alloy 5052, 5005, or 6061-T651 members complying with ASTM B209 (ASTM B209M), with minimum thickness 1/8 inch for structural members and 1/16 inch for non-structural members.
- C. Internal Reinforcement: ASTM A36/A36M; steel shapes as required for strength and mullion size limitations, hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
- D. Glass: Conform with requirements specified in Section 08 80 00. Sealed insulated units, outer pane of clear transparent or tinted, heat strengthened glass; inner pane of clear transparent or transluscent, laminated glass; space of sealed air, metal edge frame.

- 1. Outer Pane to match insulating units in stroefront and window; inner pane of clear laminated glass.
- 2. Glass at Add Alternate:
 - a. Photovoltaic Glass configuration as double laminated safety glass:
 - 1) Basis-of-Design: Onyx Photovoltaic Glass by Onyx Solar Energy.
 - 2) First layer: 5/16" or 8mm low-iron tempered glass.
 - 3) Second layer: EVA and Mono 6" crystalline solar cells.
 - 4) Third layer: 5/16" or 8mm tempered glass.
 - 5) Encapsulant: ethylene-vinyl acetate.
 - 6) Thickness encapsulant: 2 foils per interlayer of 1/32" EVA layers.
- E. Glazing Accessories: As standard with manufacturer of skylight system conforming with requirements specified in Section 08 80 00.
- F. Structural Glazing Adhesive: Silicone, ASTM C920, Class 25, Grade NS, neutral cure; maximum hardness of 30, when tested in accordance with ASTM D2240 using Type A durometer; minimum tensile strength of 250 psi, when tested in accordance with ASTM D412. Maximum VOC content of 100 g/L when applied on the building interior.
- G. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- H. Perimeter Sealant: Specified in Section 07 90 05.
- I. Touch-Up Primer for Galvanized Steel Surfaces: Zinc rich type.
- J. Protective Back Coating: Asphaltic mastic, ASTM D4479/D4479M Type I.
- K. Fasteners: Stainless steel.
- L. Flashings: 0.063 inch thick aluminum, same finish as system components; secured with concealed fastening method.
- M. Anchorage Devices: Type recommended by manufacturer, and required by professional engineer's design.

2.4 FABRICATION

- A. Insofar as possible, fit and assemble work in the manufacturer's shop. In so far
- B. Make joints rigid, with connections that are flush, hairline, and weatherproof.
- C. Rigidly fit and secure joints and corners with screw and spline. Make joints rigid, with connections that are flush, hairline, and weatherproof.
- D. Fabricate components to allow for expansion and contraction with minimum clearance and shim spacing around perimeter of assembly.
- E. Maintain continuous air and vapor barrier throughout assembly, with the barrier plane aligned with inside pane of glazing continuing to a heel bead of glazing sealant.
- F. Drain to exterior any water entering exterior joints, condensation occurring in glazing channels, or migrating moisture occurring within system.
- G. Prepare components to receive concealed anchorage devices. Ensure that fasteners and anchorage devices will be concealed upon completion of installation.
- H. Adhere glass to glazing frames with structural adhesive and cure under controlled conditions in shop. Field glazing of frames to glass is not acceptable.

2.5 FINISHES

- A. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; custom color to match approved sample for color and gloss.
 - Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight.
 - a. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers' written instructions.
- B. Galvanizing: ASTM A123; minimum 1.2 oz/sq ft coating thickness; galvanize after fabrication.
- C. Galvanizing for Nuts, Bolts and Washers: ASTM A153.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that structural curb is ready to receive skylight system. Coordinate installation of roofing and other adjacent work to ensure weathertight construction.

3.2 PREPARATION

A. Apply 1 coat of protective coating to concealed aluminum and steel surfaces in contact with dissimilar materials

3.3 INSTALLATION

- A. Install metal-framed skylights in accordance with manufacturer's instructions.
- B. Set skylight structure plumb, level, and true to line, without warp or rack of frames or glazing panels. Anchor securely in place in accordance with approved shop drawings.
- C. Maintain assembly dimensional tolerances, aligning with adjacent work.
- D. Apply minimum 1 coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar metals.
- E. Install sill flashings.
- F. Pack fibrous insulation in shim spaces at perimeter of assembly to ensure continuity of thermal barrier.
- G. Install glazing in accordance with Section 08 80 00.
- H. Mask adjacent surfaces, clean joint surfaces, and install backing and field-applied sealants in accordance with requirements of Section 07 90 05.
- I. Touch up damaged finishes so repair is imperceptible from 6 feet. Remove and replace components that cannot be satisfactorily touched up.

3.4 TOLERANCES

- A. Maximum Variation from Plumb, Level, or Line: 1/8 inch per 10 feet, or 3/8 inch total in overall dimension.
- B. Alignment of Two Adjoining Members Abutting in Plane: Within 1/16 inches.

3.5 FIELD QUALITY CONTROL

- A. Structural-Sealant Glazing: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, material qualification procedures, sealant testing, and fabrication reviews and checks.
- B. Structural-Sealant Compatibility and Adhesion: Test structural sealant according to recommendations in ASTM C 1401.
 - 1. Destructive test method, Method A, Hand Pull Tab (Destructive) in ASTM C 1401, Appendix X2, shall be used.
 - a. A minimum of two area(s) on each skylight face shall be tested.
 - b. Repair installation areas damaged by testing.
 - 2. Structural-Sealant Glazing Inspection: After installation of metal-framed skylights is complete, structural-sealant glazing shall be inspected and evaluated according to ASTM C 1401 recommendations for quality-control procedures.
- C. Test installed skylight for water leakage in accordance with AAMA 501.2.
- D. The Owner may engage a testing agency to perform water penetration testing under static pressure according to ASTM E 1105; uniform and cyclic static air pressure.
 - 1. Water penetration must be none for acceptance of Work.
- E. Repair or remove Work where test results and inspections indicate that it does not comply with specified requirements.
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional Work with specified requirements.

3.6 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces; wipe surfaces clean.
- C. Remove excess sealant by methods recommended by skylight manufacturer.

END OF SECTION

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION INCUDES

- A. Door hardware and related accessories.
- B. Security system hardware items and coordination.

1.2. RELATED REQUIREMENTS

- A. Section 08 11 13 Hollow Metal Doors and Frames.
- B. Section 08 14 16 Flush Wood Doors.
- C. Section 08 33 13 Coiling Counter Doors.
- D. Section 08 33 23 Overhead Coiling Doors.
- E. Section 08 42 29 Automatic Entrances.
- F. Section 08 43 13 Aluminum-Framed Storefronts.
- G. Division 26 Sections for wiring and power requirements.
- H. Division 28 Sections for access control devices installed at door openings provided as part of an electronic security access system, and for connections to building fire alarm system.

1.3 REFERENCE STANDARDS

- A. The publications listed below, including the amendments, addenda and designated changes, form a part of this specification to the extent referenced.
 - 1. Federal Specifications (FS): FF-H-111C-74 Hardware, Builders Shelf and Miscellaneous.
 - 2. National Fire Protection Association (NFPA):
 - a. Standard 70, National Electric Code.
 - b. Standard 80, Fire Doors and Windows.
 - c. Standard 101, Life Safety Code.
 - d. Standard 252, Standard Methods of Fire Tests of Door Assemblies.
 - 3. American National Standards Institute (ANSI):
 - a. A156.6, Architectural Door Trim.
 - b. A156.18, Materials and Finishes.
 - 4. International Building Code (IBC): 2012 Edition.
 - 5. Americans with Disabilities Act (ADA): Standards for Accessible Design.
 - 6. Door and Hardware Institute (DHI):
 - a. Abbreviations and Symbols.
 - b. Keying Systems and Terminology.
 - c. Recommended Locations for Builder's Hardware for Custom Steel Doors and Frames.
 - 7. Underwriters Laboratories, Inc. (UL):
 - a. UL-BMD, Building Materials Directory.
 - b. UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies.
 - c. UL 294, Standard for Access Control System Units.
 - d. UL 305, Standard for Panic Hardware.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. LEED Submittals:

- 1. Product Data for Credit MR 4.1 and Credit MR 4.2: For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
 - a. Include statement indicating costs for each product having recycled content.
- 2. Credit MR 5.1 and 5.2: List of proposed regionally manufactured materials and regionally extracted, harvested, or recovered materials.
 - a. Identify each regionally manufactured material, its source, and cost.
 - b. Identify each regionally extracted, harvested or recovered material, its source, and cost.
 - c. Include map or other similar documentation, confirming the following:
 - 1) Driving distance between location of manufacture and Project site.
 - 2) Driving distances between location of extraction, harvesting, or recovery, and Project site.
- C. Qualification Data: Submit supplier and installer qualifications verifying years of experience and hardware manufacturers' certifications; include list of completed projects having similar scope of work identified by name, location, date, reference names and phone numbers.
- D. Hardware Schedule: Submit a door hardware schedule in the manner and format prescribed and used herein, complying with the actual construction progress. Hardware schedules are intended for coordination of the work. Review and acceptance by the Architect or Owner does not relieve the Contractor of his exclusive responsibility to fulfill the requirements as shown and specified.
 - 1. Hardware Schedule Content: Based on hardware indicated, organize hardware schedule into Sets or sets showing complete designations of every item required for each door opening. Schedule shall be vertical layout similar to the format used herein. Lines shall be double spaced with pages numbered and dated.
 - a. For doors of different sizes or where hinges, locks or closers are different, a separate heading shall be used. No labeled openings shall be combined with non-labeled openings. Horizontal hardware schedules are not acceptable. Include the following:
 - 1) Number, location, hand, fire rating, size and material of each door opening (hands and swings to be determined in relation to key side of opening).
 - 2) Type, style, function, size, finish and quantity of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastening requirements.
 - 5) Explanation of abbreviations used (use nomenclature consistent with DHI's "Abbreviations and Symbols" wherever possible).
 - 6) Special mounting locations and instructions.
 - b. Combined submittals are not acceptable. Do not combine hardware schedules with door and frame shop drawings.
 - c. Schedules not adhering to these parameters will not be reviewed.
 - 2. Hardware Schedule Index: Furnish an index cross referencing Contract Document door number and Hardware Set, and supplier's hardware set.

E. Product Data:

- 1. Submit copies of manufacturers' specifications, maintenance and keying manuals, and installation instructions for each item of door hardware.
- 2. Include photographs, catalog cuts, marked templates and other data as may be required to show compliance with these Specifications.

F. Samples:

1. Submit full size hardware samples as requested by the Architect.

- 2. Items shall remain on file in the Architect's office until all other similar items have been installed in the project. At that time, items on file will become Owner Maintenance Stock.
- G. Templates: Provide necessary templates and/or physical hardware to all trades or factories requiring them so they may cut, reinforce or otherwise prepare their material or product to receive the hardware item. If any manufacturer requires physical hardware, ship to them such hardware via prepaid freight in sufficient time to prevent any delay in the execution of their work.
- H. Keying Schedule: Detailed keying system schedule, indicating Owner's approved keying system, for Owner's review and approval. Include the following:
 - 1. Schematic keying diagram
 - 2. Index identifying each key set to unique door designations.
 - 3. Bitting list.
- I. Wiring Diagrams: After Hardware Schedule has received Architect's approval; submit the following:
 - 1. Diagrammatic details of electrified door hardware. Include fire alarm and/or access control system interface where applicable. Diagrams shall be complete by opening and shall indicate connections between all components affected. Manufacturers' standard line diagrams are not acceptable. Include the following:
 - a. System schematic.
 - b. Point-to-point wiring diagram.
 - c. Riser diagram.
 - d. Elevation of each door.
 - 2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
- E Contract Closeout Submittals:
 - 1. Operating Instructions: Furnish two copies of the Operation and Maintenance manual. Coordinate delivery with the post-installation job site meeting. The manual will consist of a hard cover and three-ring binder with the project name on the front. Include the following:
 - a. Final copy of the hardware schedule.
 - b. Catalog cuts for the schedule.
 - c. Final keying schedule.
 - d. Names and phone numbers of the maintenance representatives for each item supplied.
 - e. Any specialized tools needed to maintain the hardware.
 - 2. Warranty: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Contractor: Assign the installation of hardware to tradesmen experienced in the installation of commercial door hardware.
- B. Supplier Qualifications:
 - 1. Supplier shall be a recognized architectural door hardware supplier, with warehousing facilities, who has been furnishing hardware in the Project's vicinity for a period of not less than two years.
 - a. Supplier's responsibilities include supplying and installing door hardware. Supplier must employ an Architectural Hardware Consultant who shall be available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware
 - b. Scheduling Responsibility: Preparation of door hardware and keying schedules.

- 2. Hardware Installers shall be trained and certified by the Lock, Door Closer, and Exit Device Manufacturers.
- 3. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
- C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
 - 1. Substitutions: Manufacturers and model numbers are listed to establish a standard of quality and design. Architect must approve all proposed product substitutions. Any request for substitution must be submitted ten days prior to Bid Date, to allow sufficient time for consideration and time for any addendum to be added to the Bid Documents.
- D. Accessibility for Disabled Persons: Special hardware requirements for knurling, slow acting closers or other barrier free opening requirements shall be provided as indicated in the Door Hardware Sets and as required to comply with the U.S. Department of Justice's "ADA Standards for Accessible Design".
- E. Hardware for Fire Doors and Exit Doors: Hardware for fire doors shall conform to NFPA 80; hardware for exit doors shall conform to NFPA 101. Other requirements specified shall also apply. Such hardware shall comply with the applicable UL standards for the intended use specified and be listed in UL BMD, or be labeled and listed by another testing laboratory deemed acceptable by the Owner and Architect.
 - 1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
 - a. Test Pressure: After five minutes into the test, neutral pressure level in furnace shall be established at 40" or less above the sill.
- F. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- G. Keying Conference: Conduct conference at Project site. In addition to Owner, Contractor, and Hardware Supplier's Architectural Hardware Consultant, conference participants shall also include Hardware Installer.
 - 1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
- H. Pre-Installation Conference: Conduct conference at Project site. Review methods and procedures related to electrified door hardware including, but not limited to, the following:
 - 1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
 - 2. Review sequence of operation for each type of electrified door hardware.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review required testing, inspecting, and certifying procedures.
- I. Reference Standards: Except as otherwise required by governing authorities or Contract Documents, comply with applicable provisions of Door and Hardware Institute.

1.6 PRODUCT DELIVERY

- A. Deliver door hardware to the Contractor. Direct factory shipments (drop shipments) to the job site are not acceptable.
 - 1. Deliver items of hardware at the proper times to the proper locations (shop or project site) in their original individual containers, complete with necessary appurtenances including screws, keys, manufacturers' printed instructions, and where necessary, installation templates for manufacturer's suggested installation. Mark each individual container with the manufacturer's name and catalog number as they appear in the hardware schedule.
 - 2. Representatives of the Contractor and the Hardware Supplier shall jointly inventory the door hardware. Replace items damaged in shipment promptly and with proper material without additional cost to the Contractor. Handle all hardware in a manner to eliminate marring, scratching or damage.
- B. Environmental Concern for Packaging: The hardware shipped to the jobsite is to be packaged in biodegradable packs such as paper or cardboard boxes and wrapping. If non-biodegradable packing such as plastic, plastic bags or large amounts of Styrofoam is utilized, the Contractor will be responsible for the disposal of the non-biodegradable packing to a licensed or authorized collector for proper recycling.

C. Keys and Cores:

- 1. Supply construction master keys and cores to Contractor when cylinders are delivered, for use during construction.
- 2. Prior to the scheduled completion of the project, manufacturer shall ship all permanent keys and cores, including permanent control keys, directly to the Owner via Registered Mail, Return Receipt Requested or other pre-approved means. Under no circumstance shall any permanent keys or cores be furnished direct to the Contractor.
- D. Key Cabinet: Deliver key cabinet to the Owner prior to building occupancy.

1.7 WARRANTIES

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fails in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of operators and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

B. Warranty Periods:

- 1. Hinges: Life of the Building.
- 2. Manual Closers: Ten years from date of Substantial Completion.
- 3. Continuous Hinges: Ten years from date of Substantial Completion.
- 4. Exit Devices: Five years from date of Substantial Completion.
- 5. Locksets: Five years from date of Substantial Completion.
- 6. All other hardware items: One year from date of Substantial Completion.

1.8 EXTRA MATERIALS

A. Furnish three dozen extra screws and other fasteners of each size, type and finish used. Deliver extra screws and fasteners to the Hardware Installer for use during installation. All unused screws and fasteners, and all special installation tools furnished with the hardware, shall be turned over to the Owner at the completion of the job.

ART 2 - PRODUCTS

2.1 TEMPLATE HARDWARE

A. Hardware to be applied to metal or pre-finished doors and frames shall be made to template. Coordinate hardware locations to prevent interference with other hardware items.

2.2 HARDWARE ITEMS

A. All hardware shall be clearly and permanently marked by the manufacturer where it will be visible after installation.

B. Butt Hinges:

- 1. Furnish two hinges for doors 60" or less in height and one additional hinge for each additional 30" of height or fraction thereof.
- 2. Unless otherwise specified, hinges for doors through 36" wide shall be 4.5" x 4.5"; hinges for doors over 36" wide shall be heavyweight 5" x 4.5".
- 3. All butt hinges shall have five knuckles. Furnish non-removable pins (NRP) for all reverse bevel doors receiving keyed locks, rigid outside trim or exit only hardware. Provide hinges with holes in the bottom plug to facilitate pin removal.
- 4. Hinges for labeled doors shall comply with the requirements of NFPA 80. Hinges with anti-friction bearings may be furnished in lieu of ball bearing hinges; except where prohibited on fire doors by the requirements of NFPA 80.
- 5. Acceptable Products: Hager Companies specified. Equal products by McKinney or Stanley Access Technologies, shown below, will be acceptable.

<u>McKinney</u>	<u>Hager</u>	<u>Stanley</u>
TA2714	BB1279	FBB179
TA2314	BB1191	FBB191
T4A3786	BB1168	FBB168

C. Continuous Hinges:

- 1. Geared extruded aluminum leafs with interlocking cover and nylon bearings, full door height.
 - a. Hinges shall consist of two full height bearing levers, geared together for the full length of the hinge and joined with a cover channel.
 - b. Hinges are to be heavy duty type design with a minimum of 32 bearings, up to 84" in height. Bearings are to be completely concealed in a full cover channel.
 - c. Fire rated hinges are to be certified by UL, with embossed stamping.
 - d. Install all hinges with only the manufacturer's self-drilling, hardened plated screws.
 - e. Where the door jamb, trim or wall projects to such an extent that the width of the hinge leaf specified will not allow the door to properly clear the frame or trim, furnish hinges of sufficient width to allow the door to swing to the required degree of opening.
- 2. Continuous hinges to be used at all aluminum storefront, cross-corridor, stairwell, cafeteria, gymnasium, locker room and exterior openings, and interior openings where doors are greater than 36" wide.
- 3. Acceptable Products: Select Products Limited specified. Equal products by PBB, Inc. or Zero International, shown below, will be acceptable.

<u>PBB</u>	Select	<u>Zero</u>
CG31L	SL24 HD	914DB

D. Cylinders:

1. Provide cylinders for locksets, deadlocks, locking trim for exit devices, exit device dogging, lockable mullions, and all other locking devices indicated in the Hardware Sets.

2. Description:

- a. Cylinders shall be 6-pin interchangeable core type with cores removable by special control key.
- b. Cylinder parts manufactured from brass, bronze, stainless steel, or nickel silver.
- c. Equip all cylinders with brass color-coded, temporary cores for use during construction and for testing the hardware; plastic cores are prohibited.
- d. Include all necessary extensions, cams, tail pieces and hardened collars required for a complete installation.
- 3. Acceptable Products: Corbin Russwin specified. Equal products by Sargent or Schlage, shown below, will be acceptable.

<u>Corbin Russwin</u> <u>Sargent</u> <u>Schlage</u>

Access 3 Degree Everest 29

E. Locks and Latches:

- 1. All internal working parts shall be brass, bronze, steel or stainless steel. For each lock and latchset, provide strike box and square corner ASA strike with curved lips of sufficient length to protect frames; furnish flat lip strikes at pairs.
 - a. Furnish knurling to lever on corridor side of door to all doors leading to hazardous areas (e.g. Mechanical Rooms, Electrical Rooms, Elevator Machine Rooms, etc.).
- 2. Furnish keyed devices with cylinders keyed to building system.
- 3. Electrical Modifications:
 - a. Locks specified to be electrified shall be modified to Electrically Lock (FAIL SAFE) or Electrically Unlock (FAIL SECURE), as indicated, upon receipt of a 24V signal and will remain in this mode until signal is interrupted.
 - b. Locks indicated to have "Request-To-Exit" switches shall incorporate internal SPDT contacts for remote signaling of operation of the inside lever handle. Switches shall be used in conjunction with the Electronic Security Control System to accommodate "authorized egress".
 - c. Field-connect electrified locks to associated power transfer units; coordinate electrical connection and installation with Divisions 26 and 28.
- 4. Acceptable Products: Corbin Russwin specified. Equal products by Sargent or Schlage, shown below, will be acceptable.

Corbin RusswinSargentSchlageML2000 x NSB8200 x LNLL9000 x 06A

DL4000 4870 L460

F. Exit Devices and Exit Device Accessories:

- 1. All devices shall be non-handed "touch bar" type with stainless steel push pads; concealed or surface mounted rod type devices are not acceptable with exception of cross-corridor pairs of doors and then only recessed type concealed vertical rod devices Less Bottom Rod (LBR) are acceptable.
- 2. Refer to the Hardware Set Schedule for grade and function. Where lever handle functions are required, they shall match the design and construction of lever handles specified for locks and latches.
 - a. At mortise exit devices, provide strike box and square corner, stainless steel ASA strike with curved lips of sufficient length to protect frames; furnish flat lip strikes at pairs.
 - b. End caps shall be flush-mounted with mechanism housing to resist damage; overlapping end caps are not acceptable.
- 3. Exit devices shall meet the performance tests found in the Underwriters Laboratories Standard UL305 and bear the UL listing mark for panic hardware.

- a. Provide UL-labeled fire-exit hardware at all fire- and smoke-rated openings. Fire exit devices shall be certified by Underwriters Laboratory to be in compliance with positive pressure standard UL10C.
- 4. Furnish keyed devices with cylinders keyed to building system.
- 5. Provide keyed removable mullions of the type and finish specified. Mullion cylinders are to be keyed to building standard key system, keyed-alike and master keyed, as directed by the Owner.
- 6. Exit devices shall be installed with sex bolts and trim shall be through bolted on lock and hinge side of doors.
- 7. Electrical Modifications:
 - a. Exit devices specified to be electrified shall be factory-modified to Electrically Lock (FAIL SAFE) or Electrically Unlock (FAIL SECURE), as indicated, upon receipt of a 24V signal and will remain in this mode until signal is interrupted.
 - b. Exit devices indicated to have electric latch retraction shall be modified to electrically unlatch (dog down) upon receipt of a 24V signal and will remain unlatched until signal is interrupted.
 - c. Exit Devices indicated to have "Request-To-Exit" switches shall incorporate internal SPDT contacts for remote signaling of operation of the push pad. Switches shall be used in conjunction with the Electronic Security Control System to accommodate "authorized egress".
 - d. Field-connect electrified exit devices to associated power transfer units. Coordinate electrical connection and installation with Divisions 26 and 28.
- 8. Acceptable Products: Von Duprin specified. Equal products by Precision Hardware, Inc. or Sargent, shown below, will be acceptable.

Precision	<u>Sargent</u>	Von Duprin
2000 Series	80 Series	98 Series
KR822 x ST989	L980S x 651	KR4954 x 154
KRFL822 x ST989	12-L980S x 651	KR9954 x 154

G. Surface Closers:

- 1. All closers are to be heavy duty, surface mounted, and hydraulic-type, with a high strength cast iron case. Full rack and pinion constructed of heavy steel. Pinion shall have full complement needle bearings and the bore diameter of the cylinder shall be 1.5".
- 2. Closer arms shall be forged steel and fluid shall accommodate all applicable weather conditions.
 - a. Supply appropriate arm assembly for each closer so that closer body and arm are mounted on non-public side of door opening, except where otherwise listed in the hardware sets.
 - b. Regular arms shall be heavy duty cold forged; Dorma (C950), Sargent (O) or LCN (3077).
 - c. Parallel arms shall be heavy duty cold forged; Dorma (SPA), Sargent (P10) or LCN (EDA).
 - d. Where required to avoid interference with acoustical seals, provide closer mounting brackets for proper frame attachment. Field-paint brackets to match frame finish.
- 3. Where factory sized closers are specified, sizes are to be determined by manufacturer's recommendations for door size, location and applicable handicap requirements.
- 4. Provide surface closers complete with accessory items and attachments, including full closer covers, special arms, soffit shoes, and drop plates. Corner bracket installations are not acceptable.
- 5. Closers, covers, brackets and other components shall not extend below bottom of top horizontal rail of door.

- 6. Door closers shall be installed with sex bolts.
- 7. Acceptable Products: Dorma Door Controls specified. Equal products by LCN Closers or Sargent, shown below, will be acceptable.

DormaLCNSargent8900 Series4010 Series281 Series

H. Low Energy Operators:

- 1. Operators shall be of heavy-duty construction. Sizes are to be determined by manufacturer's recommendations for door size and location.
- 2. Units shall operate as manual door closers unless operator is activated and when power is lost.

3. Operation:

- a. Pressing actuator switch automatically opens door leaf to 90-degrees, operator then manually closes door after variable time delay expires.
- b. Provide wall- and jamb-mounted stainless steel actuator plates as indicated. Hardwired actuators shall operate on voltage provided by operator.
- c. Engrave the International Symbol for Accessibility on all plates; fill with blue enamel paint.

4. Control Unit:

- a. Micro-processor controlled.
- b. Provide adjustable opening speed, adjustable backcheck speed, adjustable closing speed, and adjustable hold-open period.
- c. Provide built-in 3-position switch for "OFF", "ON" and "HOLD-OPEN" operation and to deactivate actuator switches.
- d. Provide safety-stop feature. If object or obstruction is encountered during opening and/or closing cycles, door operator stops and slowly returns to closed or open position respectively.
- e. Provide with safety circuit so that if actuator switch is activated when door is latched or locked, power operator resets without operator and/or door damage.
- 5. Manufacturer shall provide detailed wiring diagrams showing point-to-point hook-up of all components affected (e.g. operators, actuators, power, etc.).
- 6. Accessories: Furnish complete with fastenings, fittings, and other accessories as required for a complete installation.
- 7. Coordinate installation and electrical connection with Divisions 26 and 28.
- 8. Acceptable Products: LCN Closers specified. Equal products by Dorma Entrances Systems or Nabco Entrances, Inc., shown below, will be acceptable.

Dorma LCN Nabco
ED400 9500 Series GT System 710

I. Protection Plates:

- 1. Except where narrow bottom rails dictate a smaller size, kick plates shall be 10" high, armor plates 34" high and mop plates 6" high.
- 2. Armor and kick plates shall be 2" less than the door width on single doors and 1-1/2" less than the door width on double doors, mop plates shall be 1/2" less than the door width on all doors.
- 3. Armor plates on labeled doors shall comply with the requirements of NFPA 80.
- 4. Where required, factory-prepare flat goods for cylinders and turn pieces.
- 5. Fasteners: All flat goods shall be furnished with Phillips undercut, countersunk screws per ANSI A156.6. Trusshead screws are not acceptable.
- 6. Acceptable Products: Hager Companies specified. Equal products by Rockwood or Trimco, shown below, will be acceptable.

<u>Hager</u> <u>Rockwood</u> <u>Trimco</u> 194S Series K-050 Series K-050 Series

J. Push and Pull Plates:

- 1. Beveled on all sides, fabricated from 1/8" thick stainless steel.
 - a. Push plates shall be 6" wide and 16" high.
 - b. Pull plates shall be 4" wide and 16" high.
- 2. Door Pulls: Fabricate pull bars from solid stainless steel bar stock. Provide a minimum 2-1/2" clearance; 10" center-to-center.
- 3. Acceptable products: Hager Companies specified. Equal products by Rockwood or Trimco, shown below, will be acceptable.

<u>Hager</u>	<u>Rockwood</u>	<u>Trimco</u>
80S	73E	1001-11(1/8")
80S x H4J	BF111 x 73C	1001-11(1/8") x 1194-3

K. Auxiliary Hardware:

- 1. Manual Flush Bolts: Top manual flush bolts shall not exceed 74-inches from floor to centerline.
- 2. Stops: Provide cast wall stops wherever door strikes wall. Where wall stops are not suitable, furnish floor stops.
- 3. Coat Hooks: Provide coat hooks at all private offices and private toilets.
- 4. Silencers: Provide rubber silencers for hollow metal and wood frames; furnish three per single door and four per pair
 - a. Silencers are not required at aluminum frames or at doors specified to receive continuous seals or weather-stripping.
- 5. Acceptable Products: Rockwood specified. Equal products by Hager Companies or Ives, shown below, will be acceptable.

<u>Hager</u>	<u>Ives</u>	Rockwood
230W	WS402CVX	400
241F/246B	FS13/R14	441CU
269F	FS18S	466
282D	FB457	555
280X	DP2	570
307D	SR64	608
945P	574	RM828

L. Overhead Stops:

- 1. Overhead stops shall be surface-mounted, non-handed and furnished complete with proper fasteners.
 - a. Arms and channels shall be made of extruded bronze or stainless steel.
 - b. Shock absorber to be a shock absorbing coil steel spring with a rubber insert.
- 2. Overhead stops shall be installed with sex bolts.
- 3. Provide overhead stops where wall or floor stops will not work.
- 4. Acceptable Products: Glynn-Johnson specified. Equal products by Rockwood or Sargent, shown below, will be acceptable.

Glynn-Johnson	Rockwood	Sargent
90 Series	OH900	590 Series

M. Thresholds:

1. Furnish thresholds of the type, finish and material as specified.

- 2. Fasteners shall be of stainless steel or non-ferrous material with a finish compatible with the threshold. The length of the screw used should be the proper length to allow for a minimum of 3/4" thread engagement in the floor or anchoring device used.
- 3. All aluminum extrusions are to be of Alloy 6063 hardness T-5.
- 4. Where required, field-modify thresholds to receive strikes for exit devices and flush bolts.
- 5. Acceptable Products: Pemko specified. Equal products by Hager Companies or National Guard Products, shown below, will be acceptable.

<u>Hager</u>	National Guard	<u>Pemko</u>
520S	896S	2005T
418S	411	151

N. Weather-Stripping and Gaskets:

- 1. Furnish all weather-stripping, gasketing, door bottoms and astragals of the type, finish and material as specified.
- 2. All gasketing material shall be silicone or neoprene.
- 3. Smoke Seals: At all fire-rated wood doors, all 20-minute rated doors, and any other doors required to be 'smoke resistant', provide the following:
 - a. Head and Jambs: Smoke seals equal to Pemko #S88BL.
 - b. Meeting Stile at Pairs: Astragal seals equal to one Pemko #375R or two Pemko #316S as appropriate for intended hardware operation.
 - c. Refer to the Drawings for required locations.
- 4. Acceptable Products: Pemko specified. Equal products by Hager Companies or National Guard Products, shown below, will be acceptable.

<u>Hager</u>	National Guard	<u>Pemko</u>
873S	110N	332R
750S	200N	315N
896S	156S	316S
874S	109N	375R
810S	16	346
726S	5050C	S88BL

O. Key Control System:

- 1. Provide key cabinet made of cold rolled, minimum 18-gauge furniture steel electrowelded. Doors shall have continuous brass pin piano type hinge. All locks shall be nickel plated with solid brass pin tumbler cylinder. Key cabinet and key control system shall accommodate all keys for this project plus fifty percent expansion.
- 2. The key cabinet shall be a three-way cross index system and shall include a hardbound copy and disk, including master key listing the keys alphabetically, the hooks numerically and the key bitting changes numerically. Include three receipt forms for each key-holding hook. The Hardware Supplier shall be responsible for properly identifying and tagging all change keys, setting up the key cabinet and key index system.
 - a. Key tags shall consist of two sets: Permanent self-locking key markers and loan key snap hook type with tag colors as follows: Red fiber marker of the permanent self-locking type which shall be engraved the legend, "File Key Must Not Be Loaned."
 - b. Furnish for each hook a white key marker with snap hooks engraved "Loan Key."
 - c. Attach the keys to the two sets of numbered tags supplied with the cabinet, permanent tag and the loan key tags.
- 3. Verify that all locksets are installed in their proper location and that the key change operates the correct lock.
- 4. Attach a key tag to each change key and mark thereon the respective architectural key symbol and key bitting number. Each group of keys shall be contained in a key gathering

envelope, which shall include the architectural key symbol, key bitting number and architectural room description number.

- 5. Key Index System Shall Include:
 - a. Hook number.
 - b. Key symbol.
 - c. Architectural door number.
 - d. Owner's revised room number.
 - e. Key bitting number.
- 6. The Hardware Supplier shall include in their scope of work all labor necessary to completely layout the key index system and install all keys, properly identified in the key cabinet, and instruct the Owner in the use of the system.
- 7. Acceptable Products: Lund specified. Equal products by MMF Industries or Telkee, shown below, will be acceptable.

<u>Lund</u> <u>MMF</u> <u>Telkee</u> 1205-AA Dupli-Key AWC-450-S

P. Electromagnetic Door Holders:

- 1. Provide wall-mounted units to hold doors in open position and to release and automatically close under alarm conditions.
- 2. Electromagnet shall be protected against transients and voltage surges up to 600 volts.
- 3. Electrical wiring of these products shall be in accordance with the National Electrical Code (NFPA 70) for the appropriate class of circuit.
- 4. Wall must be properly reinforced and outlet box adequately fastened. Where required, provide manufacturer's armature extensions for proper magnet alignment.
- 5. Coordinate installation and electrical connection with Divisions 26 and 28.
- 6. Acceptable Products: LCN Closers specified. Equal products by Rixson or Sargent, shown below, will be acceptable.

<u>LCN</u> <u>Rixson</u> <u>Sargent</u> SEM 7840 998 1561

O. Power Transfer Pivots:

- 1. Concealed PTFE-jacketed wires, secured at each leaf and continuous through sleeve.
- 2. Field-connect power transfer units to associated electrified locking hardware. Coordinate electrical connection and installation with Divisions 26 and 28.
- 3. Acceptable Products: Von Duprin, Inc. specified. Equal products by Securitron Magnalock, shown below, will be acceptable.

<u>Securitron</u> <u>Von Duprin</u> CEPT Series EPT Series

R. Power Supplies:

- 1. Furnish power supplies specifically designed to interface with all designated electrical security components.
- 2. Power supplies shall be Underwriter Laboratories (UL) listed and test to meet UL 1012 and UL 294 specifications.
- 3. Units shall provide a modular interface with a minimum of twelve independent stations and alarm system. Output voltage shall be filtered and regulated.
- 4. Power supplies shall have a NEMA, UL listed enclosure, with battery backup and a key locking cover.
- 5. Coordinate installation and electrical connection with Divisions 26 and 28.
- 6. Acceptable Products: Von Duprin, Inc. specified. Equal products by Precision Hardware, Inc. or Sargent Manufacturing Company, shown below, will be acceptable.

<u>Precision</u> <u>Sargent</u> <u>Von Duprin</u>

ELR150 Series 3500 Series PS900 Series

- S. Magnetic Door Contacts:
 - 1. Magnetic door contacts are furnished by the Security System Integrator. Furnish templates for products so doors and frames are properly factory-machined to receive material without field-modification.
- T. Special Tools: Provide any necessary special tools (e.g. spanner and socket wrenches, dogging keys, etc.) required to service and adjust hardware items

2.3 HARDWARE FINISHES

- A. Base metals: Produce hardware units of basic metal and forming method indicated, using manufacturers standard metal alloy composition, temper and hardness, but in no case of lesser quality than specified or inferred by use of a particular manufacturer's number, style or grade or as established by appropriate referenced specification listed herein.
- B. Finishes: Finishes shall conform to the quality of finish including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than the standards established by ANSI/BHMA A156.18 or Federal Specifications FF-H-111C as applicable.
 - 1. All exposed hardware except surface closers, ferrous hinges and continuous hinges shall be satin stainless steel, ANSI/BHMA 630/US32D.
 - a. Factory-finish surface closers to match satin stainless steel.
 - b. Butt hinges at exterior doors and doors in wet areas shall be satin stainless steel; butt hinges at all other doors shall be satin chrome plated, ANSI/BHMA 652/US26D.
 - c. Continuous geared hinges shall have a clear anodized finish.
 - d. Items of hardware not available in stainless steel shall be furnished with a stain chrome finish.
 - 2. Where painting of primed surfaces is required, refer to Division 09 specifications.

2.4 KEYING

- A. Key System: Provide the type of system required (e.g. master, grand master, great grand master); nomenclature and layout to be consistent with DHI "Keying Systems and Terminology".
 - 1. Keying is the responsibility of the Contractor; and shall be performed by the Cylinder Supplier.
 - 2. Key System Summary, Cover Sheet, and Letter of Authorization shall accompany Keying Schedule and Purchase Order sent to Factory.
- B. Keys: Provide keys of nickel silver only in the following quantities:
 - 1. Four changes keys for each cylinder; keyed-alike sets to be supplied with fifteen change keys.
 - 2. Ten master keys for each group or set.
 - 3. Six grand master keys to be supplied for the project.
 - 4. Ten construction master kevs.
 - 5. Ten control keys for removal of cores four construction and six permanent.

C. Identification:

- 1. All keys shall be stamped "DO NOT DUPLICATE".
- 2. Stamp all change keys with keyset symbol (VKC), but do not stamp with key section or bitting number.
- 3. Stamp all cores with concealed keyset symbol (CKC), but do not stamp with key section or bitting number.

2.5 FASTENERS

- A. Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping or sheet metal screws except as specifically indicated.
 - 1. All hardware shall be installed using screws and attachments furnished with the hardware; no other screws or attachments and acceptable. Provide Phillips flat head or oval head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such work as closely as possible, except as otherwise indicated.
 - a. Where wood screws are required they shall be full thread (to the head) type. Combination wood/machine screws, in lieu of wood screws, are not acceptable.
 - 2. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard manufactured units of the type specified are available with concealed fasteners. Do not use through bolts for installation except where it is not possible to adequately reinforce the work, to accept machine screws or concealed fasteners or another standard type, to satisfactory avoid the use of through bolts. Grommet nuts and cealnuts are not acceptable.
 - 3. Furnish fasteners which are compatible with both the unit fastened and the substrate, and which will not cause corrosion or deterioration of hardware, base material reinforcement or fastener. Furnish wall stops with "Toggler" anchors and wood screws. Furnish thresholds and floor stops with lead anchors and 1/4-20 stainless steel machine screws.

PART 3 - EXECUTION

3.1 STORAGE AND HANDLING

- A. Representatives of the Contractor and the Hardware Supplier shall jointly inventory the door hardware. Replace items damaged in shipment promptly and with proper material without additional cost to the Contractor. Handle all hardware in a manner to eliminate marring, scratching or damage.
- B. A dry, locked storage space complete with adequate shelving shall be set aside for the purpose of unpacking, sorting out, checking and storage. Control the handling and installation of hardware items, whether immediately replaceable or not, so completion of the work will not be delayed by losses before or after installation.
- C. Tag each item or package separately, with identification related to the final approved hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of thickness, profile, swing, security and similar requirements indicated as necessary for proper installation and function.

3.2 COORDINATION

- A. Coordinate Door Hardware Schedule submission and hardware ordering to insure delivery of all items as directed by the Contractor.
 - 1. Prior to ordering any hardware, examine the shop drawings and details of doors and frames and other substrate suppliers to determine that the proper type and size pieces of hardware are being furnished. No extra for material or labor will be allowed for any corrections that should have been eliminated by proper prior coordination.
- B. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, and access control system.

3.3 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 INSTALLATION

- A. Install each hardware item in accordance with final approved Hardware Schedule and manufacturer's instructions.
 - 1. Set hardware level, plumb and true to line and location.
 - 2. Adjust and reinforce attachment substrate as required for proper installation and operation of hardware.
 - 3. Drill and countersink units which are not factory-prepared for anchorage fasteners; space fasteners and anchors uniformly, in accordance with industry standards.

B. Hardware Mounting Heights:

- 1. Provide heights as indicated on Drawings, except as otherwise required for compliance with governing regulations.
- 2. The following mounting heights supersede manufacturer's recommendations and shall apply throughout the work unless otherwise shown or specified.
 - a. Centerline of strike for levers: 38-inches.
 - b. Centerline of exit device touch pad: 38-inches (coordinate mounting height of exit device with door mid-rail location).
 - c. Centerline of strike for deadlocks: 48-inches.
 - d. Centerline of push plates and pull plates: 41-inches.
 - e. Centerline of door pulls: 38-inches.
 - f. Centerline of push bars: 38-inches.
- 3. Where heights are not indicated, comply with mounting requirements of DHI "Recommended Locations for Builder's Hardware" on custom steel doors and frames.
- C. Fire Doors and Exit Doors: Hardware for labeled fire doors shall be installed in accordance with the requirements of NFPA 80. Hardware for listed exit doors shall be installed in accordance with the requirements of NFPA 101.

D. Hinges:

- 1. Install steel doors and wood doors to comply with reference standards, as specified in door sections.
- 2. Where shimming is required to comply with tolerances, provide metal shims only.

E. Closers:

- 1. Do not install parallel arm closers until after weather-stripping or seals have been installed on head frame (where weather-stripping or seals are scheduled).
- 2. Do not cut weather-stripping or seals for attachment of closer brackets or shoes.
- 3. Adjust closers to control door swing and to provide positive latching of doors.
 - a. Adjust closers not to exceed following manual opening forces:
 - 1) Exterior doors: As required to close and latch each leaf.

- 2) Interior doors (non-fire-rated): Maximum 5-pound opening force.
- 3) Fire-rated doors: As required to close and latch each leaf.
- b. After air-handling system has been balanced, make final adjustment of all closers.

F. Door Stops:

- 1. Install stops for maximum degree of door opening swing allowed by conditions of installation.
- 2. Locate floor stops so as not to create a tripping hazard.
- 3. Locate wall stops centered on spindle of lever handles.

G. Weather-stripping and Seals:

- 1. Install continuous around door heads and jambs, and meeting stiles of pairs of doors.
- 2. Install bottom weather-stripping and automatic door bottoms for full width of door.
- 3. Do not cut weather-stripping or seals for attachment of closer brackets or shoes.
- 4. Align rain drips with the bottom edge of the door frame rabbet, set in a bed of sealant, and attach with stainless steel fasteners.
- 5. Set all exterior thresholds in full bed of mastic sealant.

H. Cylinder Cores:

- 1. When notified by the Owner, remove construction cores and install permanent cores in the presence of the Owner's designated representative.
- 2. Upon removal of temporary cores, verify that all locking components (e.g. collars, tailpieces, etc.) are still intact.
- 3. It is the Contractor's responsibility to return the construction cores and keys to the manufacturer. Construction cores and keys remain the property of the Cylinder Manufacturers.

I. Key Cabinet:

- 1. Install in accordance with manufacturer's instructions in location as directed.
- 2. Keys shall be tagged, neatly installed within the key cabinet, and delivered to the Owner or designated representative. Submit documentation of keying compliance including copies of signed transmittals for all building keys, cores and cabinets provided.

J. Coordination with Adjacent Finishes:

- 1. If cutting and fitting are required to install hardware onto or into surfaces that are later painted or finished in another way, install each item completely and then remove and store in secure place during finish application.
- 2. After completion of finishes, reinstall each item.
- 3. Do not install surface mounted items until finishes are complete on substrate.

3.5 ADJUST AND CLEAN

- A. General: To insure proper operation and function of every unit, adjust and check each operating item of hardware and each door. Lubricate moving parts with type lubrication recommended by the manufacturer (graphite-type if no other recommended). Replace unit that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
- B. Manufacturer's Field Service: Prior to final acceptance by the Owner, all exit devices shall be inspected after installation by a factory representative to insure proper adjustment and operation. The factory representative shall submit a written report to the Owner, Contractor, Architect and Hardware Supplier upon completion of this inspection. This report shall include door numbers and location indicating any deficiencies with recommendations to correct the problem. It is the responsibility of the Hardware Supplier to initiate this inspection with the manufacturer.

- C. Fire Door Assembly Inspection and Testing: Upon completion of the installation, provide functional testing and inspection of each fire door assembly on the project to confirm proper operation and that it meets all criteria of a fire door assembly as per NFPA 80. Inspections shall be performed by individuals with knowledge and understanding of the operating components of the door being subjected to testing and who are certified by Intertek Group as a Fire Door Assembly Inspector (FDAI) or a credentialed Architectural Hardware Consultant (AHC). A written report using reporting forms provided by the Door and Hardware Institute shall be maintained and transmitted to the Owner and made available to the Authority Having Jurisdiction (AHJ). The report shall list each fire door throughout the project, and include each door number, location, hardware set used and summary of deficiencies.
 - 1. Schedule fire door assembly inspection within 90 days of Substantial Completion of the Project.
 - 2. Contractor shall correct all deficiencies and schedule a re-inspection of fire door assemblies which were noted as deficient on the inspection report.
 - 3. Inspector shall re-inspect fire door assemblies after repairs are made.
 - 4. Additional re-inspections which are required due to incomplete repairs will be performed by the inspector at the expense of the Contractor.
- D. Final Adjustment: Wherever hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and conduct a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate as necessary to restore proper function and finish of hardware and doors.
 - Prior to acceptance of any electrical hardware system, an operational test shall be
 performed to determine if devices are functioning as intended by the specifications.
 Wiring shall be tested for correct voltage, current-carrying capacity, and proper grounding.
 Stray voltages in lock wiring shall be eliminated to prevent locking devices from releasing
 in critical situations.

E. Six-Month Adjustment:

- 1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
- 2. Consult with and instruct Owner's maintenance personnel on recommended maintenance procedures.
- 3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.
- 4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.
- 5. Deliver Operations and Maintenance Manuals and any special tools needed to maintain the hardware.

3.5 HARDWARE SET SCHEDULE

A. Description of Work:

- 1. The following set schedules are to be used with Drawings as guide for furnishing door hardware.
- 2. Set numbers specified correspond to set numbers indicated on Drawings.
- 3. Schedules do not reflect hand, backset (except as noted) or method of fastening of hardware items.

Set 110

Hinges BB1279

Passage latch ML2010 x M17

Hager Corbin Russwin

1	Stop	Rockwood
Set 11	1	
	Hinges BB1279	Hager
1	Passage latch ML2010 x M17	Corbin Russwin
1	Surface closer 4011-H / 4111-H	LCN
1	Kick plate 194S	Hager
1	Stop	Rockwood
Set 11	2	
	Hinges BB1279 (1250 at center location)	Hager
1	Privacy latch ML2060 x M17 x M19V x M34	Corbin Russwin
1	Kick plate 194S	Hager
1	Mop plate 194S	Hager
1	Coat hook 945P	Hager
1	Stop	Rockwood
Set 11	3	
	Hinges BB1191-32D	Hager
1	Privacy latch ML2060 x M17 x M19V x M34	Corbin Russwin
1	Surface closer 4011 x SRI finish	LCN
1	Kick plate 194S	Hager
1	Mop plate 194S	Hager
1	Coat hook 945P	Hager
1	Stop	Rockwood
Set 11	4	
	Hinges BB1279	Hager
1	Passage latch ML2010 x M17	Corbin Russwin
1	Surface closer 4011-H	LCN
1	Kick plate 194S	Hager
1 set	Seals 350CSPK – Head & Jambs	Pemko
1	Threshold 151A	Pemko
1	Automatic door bottom 420APKL / 434APKL	Pemko
1	Stop	Rockwood
0 4 11		
Set 11		Hagar
1	Hinges BB1279 Passage latch ML2010 x M17	Hager Corbin Russwin
1	Surface closer 4011 / 4111	LCN
1	Magnetic door contact (prep for GES 1076D)	Security System Integrator
1	Stop	Rockwood
1	Function: Door position status monitored through Acces	
Set 11		or conversion
Set 11	Hinges BB1279	Hager
1	Privacy latch ML2060 x M17 x M34	Corbin Russwin
1	Kick plate 194S	Hager
1	Mop plate 194S	Hager
1	Stop	Rockwood
Set 21	-	Rockwood
Set 21	Continuous hinge SL24 HD	Select
1	Continuous iiiige SL24 IID	Select

1 1 1 1 1 1 Set 213 1 1 1	Classroom intruder deadlock DL4122 x M34 x M40 Push plate 80S Pull plate H84J-FB (TB pull & conceal fasteners under push plate) Surface closer 4011-DEL x SRI finish Kick plate 194S Mop plate 194S Stop Continuous hinge SL24 HD Push plate 80S Pull plate H84J-FB (TB pull & conceal fasteners under push plate) Surface closer 4011-H Kick plate 194S	Corbin Russwin Hager Hager LCN Hager Hager Rockwood Select Hager Hager LCN Hager
1	Stop	Rockwood
Set 214		
1 1 1 1 1 1	Continuous hinge SL24 HD Classroom deadlock DL4117 x M34 x M40 Push plate 80S Pull plate H84J-FB (TB pull & conceal fasteners under push plate) Surface closer 4011-H-DEL Kick plate 194S Mop plate 194S Stop	Select Corbin Russwin Hager Hager LCN Hager Hager Rockwood
Set 215		Rockwood
1	Hinges BB1279 Push plate 80S	Hager Hager
1 1 1	Pull plate H84J-FB (TB pull & conceal fasteners under push plate) Surface closer 4011 Kick plate 194S	Hager LCN Hager
1	Stop	Rockwood
Set 220		
2 2 2 2 2 2	Continuous hinges SL24 HD Push plates 80S Pull plates H84J-FB (TB pull & conceal fasteners under push plate) Surface closers 4111 Kick plates 194S Electromagnetic holders SEM 7840	Select Hager Hager LCN Hager LCN
Set 310 1 1 1 1	Continuous hinge SL24 HD Exit device 98L x 996L-BE Surface closer 4011 Stop	Select Von Duprin LCN Rockwood
Set 311 1 1 1 1	Hinges BB1279 Exit device 98L x 996L-NL Cylinder - as required Surface closer 4111 Stop	Hager Von Duprin Corbin Russwin LCN Rockwood

Set 313	3	
	Hinges BB1279	Hager
1	Exit device 98L x 996L-BE x ALK	Von Duprin
1	Cylinder - as required	Corbin Russwin
1	Surface closer 4011	LCN
1	Exit sign 670 x B4E x CSK - two centered lines engraved to	read: Rockwood
	EMERGENCY EXIT ONLY	
	ALARM WILL SOUND	
1	Stop	Rockwood
Set 314	1	
	Hinges BB1279	Hager
1	Exit device 98L x 996L	Von Duprin
1	Cylinder - as required	Corbin Russwin
1	Surface closer 4111	LCN
1	Kick plate 194S	Hager
1	Stop	Rockwood
Set 315	5	
1	Continuous hinge SL24 HD	Select
1	Exit device 98L x 996L	Von Duprin
1	Cylinder - as required	Corbin Russwin
1	Surface closer 4111	LCN
1	Kick plate 194S	Hager
1	Electromagnetic holder SEM 7840	LCN
Set 316		
1	Continuous hinge SL24 HD x EPT	Select
1	Electrified exit device 98L x E996L – FAIL SECURE	Von Duprin
1	Cylinder - as required	Corbin Russwin
1	Surface closer 4111-H-SCNS	LCN
1	Closer mounting bracket 328SPB (field-paint to match fram	
1	Kick plate 194S	Hager
1 set	Weather-stripping 332CR - Head & Jambs	Pemko
1	Threshold 2005AT	Pemko
1	Sill sweep 315CN	Pemko
1	Rain drip 346C	Pemko
1	Power transfer pivot EPT-2	Von Duprin
1	Magnetic door contact (prep for GES 1076D)	Security System Integrator
1	PIR/RTE motion sensor	Security System Integrator
1	Card reader	Security System Integrator
	Function: Access Control System shunts door contact and r	
	Motion sensor shunts door contact. Door position status mo Control System.	
Set 317	•	
1	Continuous hinge SL24 HD	Select
1	Exit device 98L x 996L	Von Duprin
1	Cylinder - as required	Corbin Russwin
1	Surface closer 4111-H	LCN
1	Kick plate 194S	Hager

1	Stop	Rockwood
Set 313	8	
	Hinges BB1279	Hager
1	Exit device 98L-2SI x 996L	Von Duprin
1	Cylinder - as required	Corbin Russwin
1	Cylinder thumbturn - as required	Corbin Russwin
1	Surface closer 4111-H	LCN
1	Kick plate 194S	Hager
1	Stop	Rockwood
Set 319	1	
1	Continuous hinge SL24 HD	Select
1	Exit device CD-98NL x VR910NL	Von Duprin
2	Cylinders – as required	Corbin Russwin
1	Surface closer 4111-SCNS	LCN
1	Closer mounting bracket 328SPB (field-paint to match frame	e) Zero
1 set	Weather-stripping 332CR - Head & Jambs	Pemko
1	Threshold 2005AT	Pemko
1	Sill sweep 315CN	Pemko
1	Rain drip 346C	Pemko
1	•	Security System Integrator
-	Function: Door position status monitored through Access C	
C at 22		5142 51 2 J 2 4 5111.
Set 32		Hanan
1	Hinges BB1279	Hager
1	Exit device 9875L x 996L-NL (US32D strike)	Von Duprin
1	Cylinder - as required	Corbin Russwin
2	Flush bolts 555	Rockwood
1	Dust strike 570	Rockwood
1	Surface closer 4111	LCN
2	Stops	Rockwood
	Astragal by door manufacturer	
Set 32.	3	
2	Continuous hinges SL24 HD	Select
1	Exit device CD-98NL x VR910NL	Von Duprin
1	Exit device LD-98EO	Von Duprin
1	Removable mullion KR4954 x 154 (field-paint to match fram	me) Von Duprin
3	Cylinders – as required	Corbin Russwin
2	Surface closers 4111-H-SCNS	LCN
2	Closer mounting brackets 328SPB (field-paint to match fran	ne) Zero
2	Kick plates 194S	Hager
1 set	Weather-stripping 332CR - Head & Jambs	Pemko
1	Threshold 2005AT	Pemko
1 set	Meeting stile gaskets 303AS	Pemko
2	Sill sweeps 315CN	Pemko
1	Rain drip 346C	Pemko
2	-	Security System Integrator
	Function: Door position status monitored through Access C	
Set 324		-
2	Continuous hinges SL24 HD	Select
∠	Continuous minges SL24 IID	Select

1 1 1 2 2 2	Exit device 98L x 996L-BE Exit device 98EO Removable mullion KR9954 x 154 (field-paint to match frame) Cylinder – as required Surface closers 4011T x 180-degree swing Kick plates 194S Electromagnetic holders SEM 7840	Von Duprin Von Duprin Von Duprin Corbin Russwin LCN Hager LCN
Set 325	5	
2	Continuous hinges SL24 HD	Select
2	Exit devices 98L x 996L	Von Duprin
1	Removable mullion KR9954 x 154 (field-paint to match frame)	Von Duprin
3	Cylinders – as required	Corbin Russwin
2	Surface closers 4111-H	LCN
2	Kick plates 194S	Hager
2	Stops	Rockwood
Set 326		
2	Continuous hinges SL24 HD	Select
1	Exit device 9827L-LBR x 996L	Von Duprin
1	Exit device 9827EO-LBR	Von Duprin
1 2	Cylinder – as required Surface closers 4111-H	Corbin Russwin LCN
2	Kick plates 194S	Hager
2	Electromagnetic holders SEM 7840	LCN
Set 400	-	Ecr
SCI 400	Cylinders - as required (verify quantity & type with door supplier) Balance of hardware by door manufacturer	Corbin Russwin
Set 411	•	
1	Continuous hinge SL24HD x EPT	Select
1	Electrified exit device EL-98NL x VR910NL	Von Duprin
1	Cylinder – as required	Corbin Russwin
1	Low energy operator 9542	LCN
2	Wireless wall-mounted actuators 8310-3856TWF	LCN
1	RF receiver 8310-865	LCN
1	Power transfer pivot EPT-2	Von Duprin
1	Power supply - see Hardware Set 432	'. C . I .
1		rity System Integrator Rockwood
1	Stop 466 Function: Access Control System retracts electric latch and enable	
	pressing actuator activates door operator. Inside actuator retracts activates door operator. When door is secured, outside actuator shapes activates actuator operator.	electric latch and
Set 412		
1	Continuous hinge SL24 HD	Select
1	Hotel lock ML2059 x M17 x M34	Corbin Russwin
1 1 set	Surface closer 4111-SCNS x 4110-61	LCN Door Manufacturer
1 set	Weather-stripping – Head & Jambs Threshold 2005AT	Door Manufacturer Pemko
1	THEORIGIA ZUUJA I	reniko

1 1 1	Function: Door position status monitored through Access Contro	Pemko Pemko rity System Integrator System.
Set 413 1 1 1 1 Set 414	Continuous hinge SL24 HD Hotel lock ML2059 x M17 x M34 Surface closer 4011-H Stop	Select Corbin Russwin LCN Rockwood
1 1 1 1	Continuous hinge SL24 HD Classroom intruder lock ML2052 x M17 Surface closer 4111 x 4110-61 Stop	Select Corbin Russwin LCN Rockwood
Set 420 2 1 1 2 2	Continuous hinges SL24HD Exit device CD-98NL x VR910NL Exit device LD-98EO Removable mullion KR4954 x 154 (field-paint to match storefrom Cylinders – as required Surface closers 4111-H-SCNS x 4110-61	Select Von Duprin Von Duprin t) Von Duprin Corbin Russwin LCN
Set 42: 2 1 1 2 1 2 1 1 1 1 1	Continuous hinges SL24HD (EPT at active leaf) Electrified exit device EL-98NL x VR910NL Exit device LD-98EO Removable mullion KR4954 x 154 (field-paint to match storefrom Cylinders – as required Low energy operator 9542 Wireless wall-mounted actuators 8310-3856TWF RF receiver 8310-865 Surface closer 4111-H-SCNS x 4110-61 Power transfer pivot EPT-2 Power supply - see Hardware Set 442	Corbin Russwin LCN LCN LCN LCN Von Duprin rity System Integrator Rockwood es outside actuator; electric latch and
Set 432 1 1 1 1 2 1 1 set 1	Continuous hinge SL24 HD x EPT Electrified exit device EL-98NL x VR910NL Cylinder – as required Low energy operator 9542 Wireless wall-mounted actuators 8310-3856TWF RF receiver 8310-865 Weather-stripping - Head & Jambs Threshold 2005AT	Select Von Duprin Corbin Russwin LCN LCN LCN LCN Door Manufacturer Pemko

1	Sill sweep 315CN (grey neoprene insert)	Pemko
1	Rain drip 346C	Pemko
1	Power supply PS914-2-BB-AO - share with Door #1002a	Von Duprin
1	Power transfer pivot EPT-2	Von Duprin
1	Magnetic door contact (prep for GES 1076D)	Security System Integrator
1		Security System Integrator
1	Card reader	Security System Integrator
1	Stop 466	Rockwood
	Function: Access Control System shunts door contact, retract enables outside actuator; pressing actuator activates door ope shunts door contact, retracts electric latch, and activates door shunts door contacts. When door is secured, outside actuator Door position status monitored through Access Control Systems	erator. Inside actuator operator. Motion sensor should not function.
Set 440		
2	Continuous hinges SL24 HD	Select
1	Exit device CD-98NL x VR910NL	Von Duprin
1	Exit device LD-98EO	Von Duprin
1	Removable mullion KR4954 x 154 (field-paint to match store	
2	Cylinders – as required	Corbin Russwin
2	Surface closers 4111-SCNS x 4110-61	LCN
1 set	Weather-stripping - Head & Jambs	Door Manufacturer
1	Threshold 2005AT	Pemko
1 set	Meeting stile gaskets 303AS	Pemko
2	Sill sweeps 315CN (grey neoprene insert)	Pemko
1	Rain drip 346C (at Door #X11 only)	Pemko
2		Security System Integrator
1		Security System Integrator
	Function: Motion sensor shunts door contacts. Door position through Access Control System.	n status monitored
Set 44	1	
2	Continuous hinges SL24 HD	Select
1	Exit device LD-98NL x VR910NL	Von Duprin
1	Exit device LD-98EO	Von Duprin
1	Removable mullion KR4954 x 154 (field-paint to match store	efront) Von Duprin
2	Cylinders – as required	Corbin Russwin
2	Surface closers 4111-SCNS x 4110-61	LCN
1 set	Weather-stripping - Head & Jambs	Door Manufacturer
1	Threshold 2005AT	Pemko
1 set	Meeting stile gaskets 303AS	Pemko
2	Sill sweeps 315CN (grey neoprene insert)	Pemko
1	Rain drip 346C	Pemko
2	Magnetic door contacts (prep for GES 1076D) Function: Door position status monitored through Access Co	Security System Integrator ontrol System.
	- -	•
Set 442	2	
2	Continuous hinges SL24 HD (EPT at active leaf)	Select
1	Electrified exit device EL-98NL x VR910NL	Von Duprin
1	Exit device LD-98EO	Von Duprin

1	Removable mullion KR4954 x 154 (field-paint to match store	front) Von Duprin
2	Cylinders – as required	Corbin Russwin
1	Low energy operator 9542	LCN
2	Wireless wall-mounted actuators 8310-3856TWF	LCN
1	RF receiver 8310-865	LCN
1	Surface closer 4111-SCNS x 4110-61	LCN
1 set	Weather-stripping - Head & Jambs	Door Manufacturer
1	Threshold 2005AT	Pemko
1 set	Meeting stile gaskets 303AS	Pemko
2	Sill sweeps 315CN (grey neoprene insert)	Pemko
1	Power supply PS914-2-BB-AO	Von Duprin
1	Power transfer pivot EPT-2	Von Duprin
2	Magnetic door contacts (prep for GES 1076D)	ecurity System Integrator
1	PIR/RTE motion sensor	ecurity System Integrator
1	Card reader S	ecurity System Integrator
1	Stop 466 (power-operator leaf)	Rockwood
	Function: Access Control System shunts door contacts, retract	ets electric latch, and
	enables outside actuator; pressing actuator activates door open	
	shunts door contact, retracts electric latch, and activates door	operator. Motion sensor
	shunts door contacts. When door is secured, outside actuator	should not function.
	Door position status monitored through Access Control System	m.
Set 44:	5	
2	Continuous hinges SL24 HD	Select
1	Exit device CD-98NL x VR910NL	Von Duprin
1	Exit device CD-99EO x VR910DT	Von Duprin
1	Removable mullion KR4954-154 (field-paint to match storefr	-
4	Cylinder – as required	Corbin Russwin
2	Surface closers 4111 x 4110-61	LCN
2	Stops	Rockwood
_		11001111004
Set 510	0	
	Hinges BB1279	Hager
1	Office lock ML2053 x M17 x M34	Corbin Russwin
1	Coat hook 945P	Hager
1	Stop	Rockwood
Set 51		
500 51	Hinges BB1279	Hager
1	Office lock ML2053 x M17 x M34	Corbin Russwin
1	Surface closer 4011-H (omit hold-open at Door #1403)	LCN
1	Kick plate 194S	Hager
1	Stop	Rockwood
	-	Rockwood
Set 512		0.1
1	Continuous hinge SL24 HD	Select
1	Office lock ML2053 x M17 x M34	Corbin Russwin
1	Surface closer 4111-DEL	LCN
1	Kick plate 194S	Hager
1	Holder-stop 494S	Rockwood
Set 51.	3	

1 1 set 1 1	Hinges BB1279 Office lock ML2053 x M17 x M34 Seals 350CSPK – Head & Jambs Threshold 151A Automatic door bottom 420APKL / 434APKL Stop	Hager Corbin Russwin Pemko Pemko Pemko Rockwood
Set 612 1 1 1 1 1 1 1 set 1 1 Set 62	Continuous hinge SL24 HD Storeroom lock ML2057 x M17 (free egress from roof) Cylinder – as required Surface closer 4111-SCNS Closer mounting bracket 328SPB (field-paint to match fram Weather-stripping 332CR - Head & Jambs Threshold 105A / 3673A / 68A x 31AA Sill sweep 315CN Rain drip 346C Magnetic door contact (prep for GES 1076D) Function: Door position status monitored through Access 6	Select Corbin Russwin LCN me) Zero Pemko Zero Pemko Pemko Pemko Security System Integrator
2 1 2 1 1 1 2 1 set 1 1 2 1 1 2 1 2 1 1 2 1 2 1 1 2 1 2 1	Continuous hinges SL24 HD (EPT at active leaf) Electrified lockset ML20906 x M17 – FAIL SECURE Flush bolts 555 Dust strike 570 Surface closer 4111 Closer mounting bracket 328SPB (field-paint to match fram Armor plates 194S Weather-stripping 332CR – Head & Jambs Threshold 2005AT Meeting stile gasket 375CR Sill sweeps 315CN Rain drip 346C Power transfer pivot EPT-2 Magnetic door contacts (prep for GES 1076D) PIR/RTE motion sensor Card reader Holder-stops 494S Function: Access Control System shunts door contacts and Motion sensor shunts door contacts. Door position status in Control System.	Hager Pemko Pemko Pemko Pemko Pemko Pemko Von Duprin Security System Integrator Security System Integrator Security System Integrator Rockwood
Set 710 1 1 1 Set 711	Hinges BB1279 Classroom lock ML2055 x M17 Kick plate 194S Stop	Hager Corbin Russwin Hager Rockwood Hager Corbin Russwin

1	Surface closer 4011-H / 4111-H	LCN
1	Kick plate 194S	Hager
1	Stop	Rockwood
Set 712		
	Hinges BB1279	Hager
	Classroom lock ML2055 x M17	Corbin Russwin
1	Surface closer 4011-H / 4111-H (omit hold-open at Door #1	833) LCN
	Kick plate 194S	Hager
	Stop	Rockwood
0 + 712		
Set 713	Llingga DD1270	Посот
	Hinges BB1279	Hager
	Hotel lock ML2059 x M17 x M34	Corbin Russwin
	Kick plate 194S	Hager
	Stop	Rockwood
Set 714	a di aratum	Q 1
	Continuous hinge SL24 HD	Select
	Classroom lock ML2055 x M17	Corbin Russwin
	Kick plate 194S	Hager
1	Stop	Rockwood
Set 715		
1	Continuous hinge SL24 HD	Select
1	Hotel lock ML2059 x M17 x M34	Corbin Russwin
1	Kick plate 194S	Hager
1	Stop	Rockwood
Set 716		
	Hinges BB1279	Hager
1	Classroom intruder lock ML2052 x M17	Corbin Russwin
1	Surface closer 4011 / 4111	LCN
1	Kick plate 194S	Hager
1	Stop	Rockwood
Set 717		
	Hinges BB1279	Hager
	Classroom lock ML2055 x M17	Corbin Russwin
1	Surface closer 4011-DEL / 4111-DEL	LCN
	Kick plate 194S	Hager
	Stop	Rockwood
Set 718	•	
	Hinges BB1279	Hager
	Electrified lockset ML20906 x M17 – FAIL SECURE	Corbin Russwin
	Surface closer 4011 / 4111	LCN
	Power transfer pivot EPT-2	Von Duprin
	Magnetic door contact (prep for GES 1076D)	Security System Integrator
	PIR/RTE motion sensor	Security System Integrator
	Card reader	Security System Integrator
	Stop	Rockwood

Function: Access Control System shunts door contacts and releases electrified trim. Motion sensor shunts door contacts. Door position status monitored through Access Control System.

Set 719		
1	Continuous hinge SL24 HD	Select
1	Hotel lock ML2059 x M17 x M34	Corbin Russwin
1	Surface closer 4111-SCNS	LCN
1	Closer mounting bracket 328SPB (field-paint to match frame)	Zero
1 set	Weather-stripping 332CR - Head & Jambs	Pemko
1	Threshold 2005AT	Pemko
1	Sill sweep 315CN	Pemko
1	Rain drip 346C	Pemko
1		curity System Integrator
	Function: Door position status monitored through Access Contr	col System.
Set 723		
2	Continuous hinges SL24 HD	Select
1	Classroom lock ML2055 x M17	Corbin Russwin
2	Flush bolts 555	Rockwood
1	Dust strike 570	Rockwood
1	Surface closer 4011-H	LCN
2	Kick plates 194S	Hager
2	Stops	Rockwood
	Astragal by door manufacturer	
Set 810		
	Hinges BB1279	Hager
1	Storeroom lock ML2057 x M17	Corbin Russwin
1	Stop	Rockwood
Set 811		
500 011	Hinges BB1279	Hager
1	Storeroom lock ML2057 x M17	Corbin Russwin
1	Surface closer 4011 / 4111	LCN
1	Stop	Rockwood
Set 812	-	
SCI 612	Hinges BB1279	Hager
1	Storeroom lock ML2057 x M17	Corbin Russwin
1	Surface closer 4011-DEL / 4111-DEL	LCN
1	Kick plate 194S	Hager
1	Stop	Rockwood
	•	Tto Chivo o u
Set 813	Continuous hinge SL24 HD	Select
1 1	Storeroom lock ML2057 x M17	Corbin Russwin
1	Surface closer 4011-DEL / 4111-DEL	LCN
1	Kick plate 194S	Hager
1	Stop	Rockwood
		NOCKWOOU
Set 816		***
	Hinges BB1279	Hager

1 1 set 1 1 Set 81	Storeroom lock ML2057 x M17 Seals 350CSPK – Head & Jambs Automatic door bottom 420APKL / 434APKL Stop	Corbin Russwin Pemko Pemko Rockwood
1	Continuous hinge SL24 HD	Select
1	Storeroom lock ML2057 x M17	Corbin Russwin
1	Surface closer 4111-H-SCNS Closer mounting breelest 228SBD (field point to motab frame)	LCN Zara
1	Closer mounting bracket 328SPB (field-paint to match frame) Armor plate 194S	Zero Hager
1 set	Weather-stripping 332CR - Head & Jambs	Pemko
1	Threshold 2005AT	Pemko
1	Sill sweep 315CN	Pemko
1	Rain drip 346C	Pemko
1	Magnetic door contact (prep for GES 1076D) Secur Function: Door position status monitored through Access Control	rity System Integrator
Set 822	•	System.
501 02	Hinges BB1279	Hager
1	Storeroom lock ML2057 x M17	Corbin Russwin
2	Flush bolts 555	Rockwood
1	Dust strike 570	Rockwood
1	Surface closer 4011-DEL / 4111-DEL	LCN
2 2	Kick plates 194S Stops	Hager Rockwood
2	Astragal by door manufacturer	Rockwood
Set 91		
	Hinges BB1279	Hager
1	Storeroom lock ML2057 x M17	Corbin Russwin
1	Surface closer 4111-H	LCN
1 set	Acoustical seals – Head, Jambs & Sill Stop	Door Manufacturer Rockwood
Set 91	•	Rockwood
Set 914	Hinges BB1279	Hager
1	Hotel lock ML2059 x M17 x M34	Corbin Russwin
1	Surface closer 4011-H	LCN
1	Kick plate 194S	Hager
1 set	Seals 350CSPK – Head & Jambs Threshold 151A	Pemko
1 1	Automatic door bottom 420APKL / 434APKL	Pemko Pemko
1	Stop	Rockwood
Set 91:		
20071	Hinges BB1279	Hager
1	Exit device 98L-2SI x 996L	Von Duprin
1	Cylinder - as required	Corbin Russwin
1 1	Cylinder thumbturn - as required Surface closer 4111-H	Corbin Russwin LCN
1	Kick plate 194S	Hager
•		114501

1 set Acoustical seals – Head, Jambs & Sill
 1 Stop

Door Manufacturer Rockwood

SECTION 08 80 00 - GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.2 REFERENCE STANDARDS

- A. 16 CFR 1201 Safety Standard for Architectural Glazing Materials; current edition.
- B. ASTM C864 Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).
- C. ASTM C920 Standard Specification for Elastomeric Joint Sealants; 2014.
- D. ASTM C1036 Standard Specification for Flat Glass; 2011.
- E. ASTM C1048 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- F. ASTM C1172 Standard Specification for Laminated Architectural Flat Glass; 2014.
- G. ASTM C1193 Standard Guide for Use of Joint Sealants; 2013.
- H. ASTM E2190 Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- I. GANA (GM) GANA Glazing Manual; 2009.
- J. GANA (SM) GANA Sealant Manual; 2008.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Samples: Submit two samples 12 by 12 inch in size of glass units.
- E. Certificates: Certify that products meet or exceed specified requirements.
- F. LEED Report: Report recycled content, location of manufacture and VOC content of sealants.
 - 1. Comply with VOC content limits of Section 01 61 16.
- G. LEED Submittal: Product data indicating visible light transmittance of insulating glass units (Credit EQ 8.1).

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

1.5 MOCK-UP

A. Locate within framing set in masonry mockup.

1.6 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.7 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
- C. Laminated Glass: Provide a five (5) year warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.1 INSULATING GLASS UNITS

2.2 EXTERIOR GLAZING ASSEMBLIES

- A. Performance Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass calculated in accordance with IBC 2015 International Building Code.
 - 1. Glass thicknesses listed are minimum.

2.3 GLASS MATERIALS

- A. Float Glass Manufacturers:
 - 1. AGC Flat Glass North America: www.afgglass.com.
 - 2. Oldcastle Glass.
 - 3. Pilkington North America Inc: www.pilkington.com/na.
 - 4. PPG Industries, Inc: www.ppgideascapes.com.
- B. Float Glass: Provide float glass based glazing unless noted otherwise.
 - 1. Annealed Type: ASTM C1036, Type I Transparent Flat, Class 1 Clear, Quality-Q3.
 - 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
 - 3. Tinted Types: ASTM C1036, Class 2 Tinted, color and performance characteristics as indicated.
 - 4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.
- C. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 - 1. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
 - 2. Plastic Interlayer:
 - a. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum.
- D. Clear Float Glass (Type G-6): Clear, annealed.
 - 1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
 - 2. 6 mm minimum thick.
- E. Safety Glass (Type G-7): Clear; fully tempered with horizontal tempering.
 - 1. Comply with 16 CFR 1201 test requirements for Category II.
 - 2 6 mm minimum thick

- 3. Provide this type of glazing in the locations indicated on the drawings.
- F. Type G-10: Flame retardant polycarbonate sheet: Clear polycarbonate sheet Basis of design Lexan 9034V.

2.4 SEALED INSULATING GLASS UNITS

- A. Manufacturers:
 - 1. Any of the manufacturers specified for float glass.
 - 2. Cardinal Glass Industries: www.cardinalcorp.com.
 - 3. Guardian Industries Corp: www.guardian.com.
 - 4. Viracon, Apogee Enterprises, Inc: www.viracon.com.
- B. Sealed Insulating Glass Units: Types as indicated.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 2. Edge Spacers: Aluminum, bent and soldered corners.
 - 3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
 - 4. Purge interpane space with dry hermetic air.
- C. Insulated Glass Units (Type G-1): Double pane with glass to elastomer edge seal.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
 - 2. Purge interpane space with dry hermetic air.
 - 3. Total unit thickness of 1 inch.
 - 4. Basis-of-Design Clear Insulating Units: Guardian SuperNeutral 54 or equal or better product of other named manufacturers.
 - a. Overall Unit Thickness and Thickness of Each Lite: 25 and 6.0 mm.
 - b. Interspace Content: Air.
 - c. Outdoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered).
 - d. Indoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered).
 - e. Low-E Coating: Second or third surface.
 - f. Visible Light Transmittance: 54 percent minimum.
 - g. Winter Nighttime U-Factor: 0.28 or better.
 - h. Summer Daytime U-Factor: 0.27 or better.
 - i. Solar Heat Gain Coefficient: 0.28 maximum.
 - j. Outdoor Visible Reflectance: 13 percent maximum.
- D. Insulating Glass Units (Type G-2): Same as G-1 except provide indoor lite to be ceramic-coated (fourth surface) spandrel glass, ASTM C 1048, Condition B (spandrel glass, one surface ceramic coated), Type I (transparent flat glass), Quality-Q3, and complying with other requirements specified.
 - 1. Outdoor lite remains Basis-of-Design product with same low-E coating on second surface.
 - 2. Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C 1048.
- E. Insulating Glass Units (Type G-3): Same as G-1 except indoor lite to be 1/4 inch thick clear laminated glass and shall have a ceramic frit on the third surface, Type I (transparent flat glass), Quality-Q3, and complying with other requirements specified.
 - 1. Outdoor lite remains Basis-of-Design product with same low-E coating on second surface.
 - 2. Frit Pattern: Viracon 1/8" horizontal lines, color Warm Grey.
- F. Insulated Glass Units (Type G-4): Double pane with glass to elastomer edge seal.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
 - 2. Purge interpane space with dry hermetic air.
 - 3. Total unit thickness of 1 inch.

- 4. Basis-of-Design Clear Insulating Units: Guardian SuperNeutral 54 and laminated colored interior lite by Pulp Studio, Colorlites or equal or better product of other named manufacturers.
 - a. Overall Unit Thickness and Thickness of Each Lite: 25 and 6.0 mm.
 - b. Interspace Content: Air.
 - c. Outdoor Lite: Laminated colored glass.
 - 1) Color to be selected by Architect from manufacturers full range.
 - d. Indoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered).
 - e. Low-E Coating: Second or third surface.
 - f. Visible Light Transmittance: 54 percent minimum.
 - g. Winter Nighttime U-Factor: 0.28 or better.
 - h. Summer Daytime U-Factor: 0.27 or better.
 - i. Solar Heat Gain Coefficient: 0.28 maximum.
 - j. Outdoor Visible Reflectance: 13 percent maximum.
- G. Insulated Glass Units (Type G-5): Double pane with glass to elastomer edge seal.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
 - 2. Purge interpane space with dry hermetic air.
 - 3. Total unit thickness of 1 inch.
 - 4. Basis-of-Design Clear Insulating Units: Guardian SuperNeutral 54 or equal or better product of other named manufacturers.
 - a. Overall Unit Thickness and Thickness of Each Lite: 25 and 6.0 mm.
 - b. Interspace Content: Air.
 - c. Outdoor Lite: Laminated colored glass.
 - 1) Color to be selected by Architect from manufacturers full range.
 - d. Indoor Lite: Class 1 (clear) float glass; Kind FT (fully tempered).
 - e. Low-E Coating: Second or third surface.
 - f. Visible Light Transmittance: 54 percent minimum.
 - g. Winter Nighttime U-Factor: 0.28 or better.
 - h. Summer Daytime U-Factor: 0.27 or better.
 - i. Solar Heat Gain Coefficient: 0.28 maximum.
 - j. Outdoor Visible Reflectance: 13 percent maximum.
- H. Sealing System: Dual seal, with primary and secondary sealants as follows:
 - 1. Primary seal shall be extruded polyisobutylene continuously bonded to glass surfaces and desiccant filled metal spacer, including corners.
 - 2. Minimum width of primary seal shall be 0.125 inch (3.2 mm). Secondary seal shall be General Electric IGS 3723 or Dow Corning 982.
 - 3. Secondary seal shall completely cover spacer with no gaps or voids, and shall be continuously bonded to both plates of glass.
 - 4. Where insulating glass is supported by structural silicone, secondary seal shall be designed to transfer specified pressures from outdoor glass to indoor glass.
- I. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
 - 1. Spacer Material: Stainless steel or thermally jacketed stainless steel.
 - 2. Desiccant: Molecular sieve or silica gel, or blend of both.
 - 3. Corner Construction: Manufacturer's standard corner construction.

2.5 FIRE-RATED GLAZING PRODUCTS (Type G-9)

- A. Laminated Ceramic Glazing Material: Proprietary Category II safety glazing product in the form of 2 lites of clear ceramic glazing material laminated together to produce a laminated lite of 5/16-inch nominal thickness; polished on both surfaces; weighing 4 lb/sq. ft.; and as follows:
 - 1. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Polished on both surfaces, transparent.
 - 3. Product: "FireLite Plus" by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products.

B. Laminated Glass with Intumescent Interlayers:

- 1. At the Contractor's discretion, transparent wall product may be used instead of ceramic product; transparent wall panel products shall meet performance requirements specified for ceramic product.
- 2. Contractor must verify proper glazing stop width and heights for ratings, with the door and frame manufacturers.
- 3. Proprietary Category II safety glazing product in the form of multiple lites of Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Kind FT (fully tempered) float glass laminated with intumescent interlayers; and as follows:
- 4. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
- 5. Product: Subject to compliance with requirements, "PyroStop" by Pilkington Building Products North America and distributed by Technical Glass Products.

2.6 CANOPY GLAZING

- A. Polycarbonate Glazing:
 - 1. Basis-of-Design: 3 Form Koda-XT.
 - a. Thickness: (12.7 mm) ½" Polycarbonate.
 - b. Colors:
 - 1) Color 1: Clear.
 - 2) Color 2: To be determined.
 - c. Top Surface: Sandstone.
 - d. Bottom Surface: Vellum.
 - e. Lap Joints.
 - f. Point Mount Supports: 3 Form XT 3D Spider supports and system.

2.7 GLAZING COMPOUNDS

- A. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
- C. Sealants applied within the building waterproofing envelope: Comply with low-emitting requirements specified in Section 01 61 16.

2.8 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products as follows:
 - 1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
 - 1. Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.
- E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I; black color.
- F. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- E. Install sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.4 INSTALLATION - EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- 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 to attain full contact.
- D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- E. Trim protruding tape edge.

3.5 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- 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 tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

3.6 FIELD QUALITY CONTROL

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

3.7 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.8 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

SECTION 08 83 00 - MIRRORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Glass mirrors.

1.2 REFERENCE STANDARDS

- A. ASTM C1036 Standard Specification for Flat Glass; 2011.
- B. ASTM C1503 Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).
- C. GANA (GM) GANA Glazing Manual; 2009.
- D. GANA (SM) GANA Sealant Manual; 2008.
- E. GANA (TIPS) Mirrors: Handle with Extreme Care (Tips for the Professional on the Care and Handling of Mirrors); 2011.

1.3 SUBMITTALS

- A. See Section 01 30 00 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. LEED Submittals: Provide product data for field-applied mastics indicating VOC content in g/L; comply with limits of Section 01 61 16.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), and _____ for glazing installation methods.
- B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with recommendations of GANA (TIPS).

1.5 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.

1.6 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.1 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: ASTM C1036, Type 1 Transparent Flat, Class 1 Clear, Quality Q2 (general use mirrors); silvering, protective coating, and quality requirements in compliance with ASTM C1503.
 - 1. Thickness: 1/4 inch.
 - 2. Size: As noted on drawings.

2.2 ACCESSORIES

- A. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- B. Mirror Adhesive: Chemically compatible with mirror coating and wall substrate.
 - 1. Product produced specifically for setting mirrors.
 - 2. Product certified by mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors are installed.
 - 3. Sealants applied within the building waterproofing envelope: Comply with low-emitting requirements specified in Section 01 61 16.
 - 4. Manufacturers:
 - a. Gunther Mirror Mastics.
 - b. Palmer Products Corporation.
 - c. Bohle.
- C. Top and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.
 - 1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.05 inch.
 - 2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.062 inch.
 - 3. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bottom Trim:
 - Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Shallow Nose "J" Moulding Lower Bar.
 - 2) C.R. Laurence Co.
 - 3) Stylmark; J-Molding Lower Bar.
 - b. Top Trim:
 - Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Deep Nose "J" Moulding Lower Bar.
 - 2) C.R. Laurence Co.
 - 3) Stylmark; J-Molding Lower Bar.
- D. Fasteners: Fabricated of compatible metal to fastened metal.

2.3 FABRICATION

- A. Mirror Sizes: To suit Project conditions, cut mirrors to final sizes and shapes.
- B. Cutouts: Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Flat polished edge.
 - 1. Seal edges of mirrors after edge treatment to prevent chemical or atmospheric penetration of glass coating.

D. Film-Backed Safety Mirrors:

- 1. Apply film backing with pressure-sensitive adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections.
- 2. Use adhesives and film backing compatible with mirror backing paint as certified by mirror manufacturer.
- 3. Provide film backing on all glass mirrors.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

3.2 INSTALLATION

- A. Install mirrors in accordance with GANA (TIPS) and manufacturers 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. Do not permit edges of mirrors to be exposed to standing water.
- E. Wall-Mounted Mirrors:
 - 1. Install mirrors with mastic and mirror channels.
 - 2. Install mirror hardware in the form of J-channels that are fabricated in single lengths to fit and cover top and bottom edges of mirrors.
 - 3. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch between back of mirrors and mounting surface.

3.3 CLEANING

- A. Remove labels after work is complete.
- B. Clean mirrors and adjacent surfaces.

3.4 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

SECTION 08 91 00 - LOUVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.2 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers.

1.3 REFERENCE STANDARDS

- A. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- B. AMCA 500-L Laboratory Methods of Testing Louvers for Rating; 2012.
- C. AMCA 511 Certified Ratings Program for Air Control Devices; 2010.

1.4 SUBMITTALS

- A. See Section 01 30 00 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 two samples 2 by 2 inches in size illustrating finish and color of exterior 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.
- G. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.

1.5 OUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.6 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Provide twenty year manufacturer warranty against distortion, metal degradation, and failure of connections.
 - 1. Finish: Include coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Airolite Company, LLC: www.airolite.com.
- B. Construction Specialties, Inc; RS-7315 (basis-of-design): www.c-sgroup.com.

- C. Industrial Louvers, Inc..
- D. Ruskin Company.

2.2 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 - 1. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
 - 2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
 - 3. Screens: Provide bird screens.
- B. Deep Storm Resistant Fixed Horizontal Louver:
 - 1. Material: Heads, sills, jambs and mullions to be one-piece structural aluminum members with integral caulking slot and retaining beads.
 - 2. Design: Architectural line drainable sightproof storm resistant fixed-blade; designed to collect and drain water to exterior at sill by means of multiple gutters in blades and channels in jambs and mullions.
 - 3. Louvers to be supplied with 4 inches high by full depth sill flashings formed from minimum 0.050 inch thick aluminum; sill flashings to have welded side panels.
 - 4. Frame: 7 inches deep, channel profile; corner joints mitered and welded.
 - 5. AMCA Performance: (48 inches wide by 48 inches high test unit)
 - a. Free Area: Minimum 8.0 sq. ft.
 - b. Intake pressure drop at 900 fpm free area velocity: Minimum 0.32 in. H2O.
 - c. Exhaust pressure drop at 900 fpm free area velocity: Minimum 0.44 in. H2O.
 - 6. Wind Driven Rain Performance:
 - a. The louver test based on a 1.00m by 1.00m core area; unit tested at a rainfall rate of 3.0 inches per hour and with a wind directed to the face of the louver at a velocity 29.1-mph.
 - b. The test data to show the water penetration effectiveness rating at each corresponding ventilation rate.

2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), .
- B. Polyvinylidene Fluoride Coating: Minimum 70 percent Kynar 500/Hylar 500 resin, three coat finish, complying with AAMA 2605.
 - 1. Color: Custom, to match approved sample.

2.4 ACCESSORIES

- A. Blank-Off Panels: Same material as louver, painted black on exterior side.
 - 1. Provide where indicated and where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.
 - 2. Uninsulated Panels: Provide at unconditioned spaces; minimum 0.050 inch thick aluminum sheet.
 - 3. Insulated Panels: Provide at conditioned spaces or where indicated.
 - a. 1 inch thick and faced on both sides with minimum 0.032 inch thick aluminum sheet.
 - b. Fabricated with an expanded polystyrene (EPS) core.

- Panel perimeter frame to be 0.050 inch thick-formed aluminum channels; panel frame mitered at the corners.
- Finish: Same quality as louvers.
- B. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
 - Bird screens to be minimum 5/8 inch mesh, 0.050 inch thick expanded and flattened aluminum bird screen secured within minimum 0.055 inch thick extruded aluminum frames: frames to have mitered corners and corner locks.
- C. Glazing Adapter: Provide where louvers are glazed into storefront or curtainwall frames; minimum 0.090 inch thick extruded aluminum.
- D. Fasteners and Anchors: Stainless steel.
- E. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
- Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.
- G. Sealant: ES-1 or ES-4 type, as specified in Section 07 90 05.

PART 3 EXECUTION

3 1 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify that field measurements are as indicated.

3.2 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louver frames in openings with concealed fasteners.
- E. Install perimeter sealant and backing rod in accordance with Section 07 90 05.

3.3 CLEANING

- Strip protective finish coverings.
- B. Clean surfaces and components.

SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Shaft wall system.
- C. Fire rated area separation walls.
- D. Acoustic insulation.
- E. Gypsum sheathing.
- F. Gypsum wallboard.
- G. Abuse resistant gypsum wallboard.
- H. Glass mat faced gypsum board.
- I. Moisture and mold resistant wallboard.
- J. Joint treatment and accessories.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

- A. ASTM C475/C475M Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- C. ASTM C840 Standard Specification for Application and Finishing of Gypsum Board; 2013.
- D. ASTM C1047 Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- E. ASTM C1280 Standard Specification for Application of Gypsum Sheathing Board; 2013.
- F. ASTM C1396/C1396M Standard Specification for Gypsum Board; 2014.
- G. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- H. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- I. ASTM E413 Classification for Rating Sound Insulation; 2010.
- J. GA-216 Application and Finishing of Gypsum Board; 2013.
- K. GA-226 Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2008.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

- D. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
- E. LEED Submittals: Provide documentation of VOC content in g/L for adhesives and acoustical sealants applied within the building waterproofing envelope; comply with VOC limits of Section 01 61 16.
- F. Submit drawings indicating proposed location of control joints for Architect's review; locations to be approved by Architect and may be adjusted for aesthetic reasons.

1.5 QUALITY ASSURANCE

- A. Maintain one copy of all installation standards at project site.
- B. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
 - 1. Maintain one copy of standards at project site.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
 - 1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
 - 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire Rated Assemblies: Provide completed assemblies identical to those tested in assembly indicated.

2.2 BOARD MATERIALS

- A. Manufacturers Gypsum-Based Board:
 - 1. CertainTeed Corporation: www.certainteed.com.
 - 2. Georgia-Pacific Gypsum: www.gpgypsum.com.
 - 3. Lafarge North America: www.lafarge.com.
 - 4. National Gypsum Company: www.nationalgypsum.com.
 - 5. USG Corporation: www.usg.com.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Regular Type:
 - a. Application: Use for vertical surfaces, unless otherwise indicated.
 - b. Edges: Tapered.
 - 2. Fire Resistant Type: Complying with Type X requirements; UL or WH rated.
 - a. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
 - b. Edges: Tapered.
 - 3. Ceiling Board: Special sag-resistant type.
 - a. Application: Ceilings, except areas with showers or otherwise indicated.
 - b. Thickness: 1/2 inch.

- c. Edges: Tapered.
- C. Abuse-Resistant Gypsum Board: ASTM C36; gypsum wall board with additives to enhance impact resistance of the core and indentation resistance to the surface, and surfaced with abrasion resistant paper on front and long edges with heavy liner paper bonded to back side.
 - 1. Location: Where Drawings indicate abuse-resistant gypsum wallboard.
 - 2. Type: Type X where required for fire-resistance-rated assemblies.
 - 3. Thickness: 5/8-inch.
 - 4. Edges: Tapered.
 - 5. Performance Properties:
 - a. Surface Abrasion: 0.284-inch, when tested according to ASTM D 4977 with 25 lb added weight, 50 abrasion cycles.
 - b. Surface Indentation: Less than 0.200-inch, when tested according to ASTM D 5420 with 72 inch-lb drop energy.
 - c. Soft Body Impact: When tested according to ASTM E 695:
 - 1) Surface Failure: 150 ft-lb.
 - 2) Structural Failure: 210 ft-lb.
 - d. Hard Body Impact: When tested according to swinging ram apparatus, 85 ft-lb.
 - 6. Acceptable Products:
 - a. Mold Tough VHI Firecode; United States Gypsum Company.
 - b. Hi-Impact XP by National Gypsum.
 - c. Air Renew Extreme Impact Resistant Gypsum Board by Certainteed.
- D. Moisture and Mold Resistant Wallboard: Wallboard installed at building perimeter, and any wallboard furred to concrete or masonry construction.
 - 1. Characteristics:
 - a. ASTM C 1396 (Section 5) regular type except where Type X fire-resistant type is indicated or required by to meet UL assembly types.
 - b. Edges: Tapered.
 - c. Resists the growth of mold when tested, as manufactured, according to ASTM D 3273
 - 2. Available Products:
 - a. SHEETROCK® Brand Mold Tough® Gypsum Panels by USG.
 - b. Gold Bond® BRAND XP® Wallboard by National Gypsum.
 - c. Mold Defense Products by LaFarge.

2.3 FIBERGLASS REINFORCED BOARD MATERIALS

- A. Glass Mat Gypsum Board: Gypsum panels with moisture-resistant core and coated inorganic fiberglass mat back surface designed to resist growth of mold and mildew, per ASTM D 3273.
 - Glass Mat Board: Comply with performance requirements of ASTM C 1396/C 1396M for water-resistant gypsum backing board and ASTM C 1177/C 1177M for sheathing; tapered long edges.
 - 2. Application: High-humidity or wet locations; walls or ceilings; high-humidity or wet locations include kitchen areas and adjacent service areas, areas with showers, janitor basins, gang toilets, mechanical penthouses and mechanical spaces with steam, hot water or condensation generating equipment.
 - a. Available Products:
 - 1) DensArmor Plus Interior Guard by G-P Gypsum.
 - 2) EXP Extreme by National Gypsum.
 - 3. Application: Sheathing.

- a. Basis-of-Design: Dens-Glass Gold Exterior Guard by G-P Gypsum; Type X.
- b. Other Available Product: CertainTeed GlasRoc Brand Sheathing; Type X.
- 4. Application: Shaftwall.
 - a. Basis-of-Design: Dens-Glass Ultra Shaft Guard by G-P Gypsum.
 - b. Contractor Option: The contractor may provide the following instead of Basis-of-Design Product.
 - 1) Fire-Shield Shaftliner XP panels by National Gypsum.
 - 2) Sheetrock Brand Gypsum Liner Panels Mold Tough by USG.
- 5. Application: Exterior soffits.
 - a. Available Products:
 - 1) Dens-Glass Gold Exterior Guard by G-P Gypsum.
 - 2) CertainTeed GlasRoc Brand Sheathing.
 - b. Core: 5/8 inch, Type X.
 - c. Finish: G-P Setting Compound followed by G-P Finish Coat.
- B. Sheathing Joint and Penetration Treatment:
 - 1. Silicone Emulsion Sealant: ASTM C 834, compatible with sheathing tape and sheathing, recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

2.4 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: Match wall thickness.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
 - 1. Comply with low-emitting requirements specified in Section 01 61 16.
- D. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 1. Types: As detailed or required for finished appearance.
 - 2. Available products include the following:
 - a. Grabber Construction Products: No-Coat Prefinished Corners.
 - b. US Gypsum Company; Beadex Paper-Faced Metal Drywall Bead and Trim.
- E. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
 - 1. Joint Tape: Paper for interior applications; 10-by-10 glass mesh for exterior locations and glass mat gypsum wallboard; 2 inch wide.
 - 2. Ready-mixed vinyl-based joint compound.
- F. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- G. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.
- H. Adhesives Applied within the Building Waterproofing Envelope: Comply with low-emitting requirements specified in Section 01 61 16.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
 - 1. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

3.3 ACOUSTIC ACCESSORIES INSTALLATION

- A. 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.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.4 BOARD INSTALLATION

- A. Comply with ASTM C 840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Cut boards at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
 - a. Install boards with a 3/8-inch setback where non-load-bearing construction abuts structural elements.
 - b. Install boards with a 1/4-inch setback where they abut masonry or similar materials that might retain moisture, to prevent wicking.
 - 2. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed exterior wall assembly.
 - 3. Apply fasteners so screw heads bear tightly against face of sheathing boards but do not cut into facing.
 - 4. Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.
 - 5. Screw-attach boards at perimeter and within field of board to each steel stud; space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
 - 6. Seal sheathing joints according to sheathing manufacturer's written recommendations.
 - a. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing board joints, and apply and trowel silicone emulsion sealant to embed sealant in entire face of tape.
 - b. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.

- c. Seal other penetrations and openings.
- F. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
 - 1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
 - 2. Fasten with corrosion-resistant screws.
 - 3. Apply glass-fiber tape to glass mat faced gypsum board joints, and apply and trowel silicone emulsion sealant to embed sealant in entire face of tape.
 - 4. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.
 - 5. Seal other penetrations and openings.
 - 6. Prepare for specified finish according to manufacturer's instructions.
- G. Glass Mat Faced Gypsum Board: Install in strict accordance with manufacturer's instructions.
- H. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.
- I. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
 - 2. At exterior soffits, not more than 30 feet apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.6 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- B. 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 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
 - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 4. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
 - 5. Level 0: Temporary partitions.
- C. 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.
- D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.7 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal partition, ceiling, and soffit framing.
- B. Framing accessories.

1.2 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. AISI SG02-1 North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)
- C. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- D. ASTM C645 Standard Specification for Nonstructural Steel Framing Members; 2014.
- E. ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- F. ASTM C754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
- G. 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; 2014.
- H. SSPC-Paint 20 Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate prefabricated work, 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. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, limitations, and head to structure connectors, showing compliance with requirements.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
- F. LEED Submittals: Provide documentation of VOC content in g/L for acoustical sealant applied within the building waterproofing envelope; comply with VOC limits of Section 01 61 16.

1.4 PROJECT CONDITIONS

A. Coordinate the placement of components to be installed within stud framing system.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Framing, Connectors, and Accessories:
 - 1. ClarkDietrich Building Systems LLC: www.clarkdeitrich.com.
 - 2. Marino: www.marinoware.com.
 - 3. Telling Industries: www.buildstrong.com.
- B. Firestop Tracks:
 - 1. Fire Trak Corp.; Fire Trak attached to study with Fire Trak Slip Clip.
 - 2. Metal-Lite, Inc.; The System.
 - 3. Clark Western; Brady's Sliptrack within UL assembly.
- C. Metal Back-up Plates:
 - 1. Metal Lite, Inc., Anaheim, CA.
- D. Grid Suspension System for Gypsum Board Ceilings and Bulkheads:
 - 1. Armstrong World Industries, Inc.; Drywall Grid Systems.
 - 2. Chicago Metallic Corporation; Drywall Furring System.
 - 3. USG Corporation; Drywall Suspension System.

2.2 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, with maximum deflection of wall framing of L/240 at 5 psf.
 - 1. Studs: C shaped with flat or formed webs with knurled faces.
 - a. Typical: Minimum 0.0283 inch, 22 gage (27 mil) except when reference standard states a more stringent requirement.
 - b. At door and glazed opening jambs, and framing supporting ceramic tile: Minimum 0.0312 inch, 20 gage (30 mil) except when reference standard states a more stringent requirement.
 - c. (Equivalent Gauge Thickness) Steel Studs and Runners: Members that can show certified third party testing with gypsum board in accordance with ICC ES AC86 need not meet the minimum thickness limitation or minimum section properties set forth in ASTM C 645-09. The submission of a recognized evaluation report is acceptable to show conformance to this requirement.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Ceiling Channels: C shaped.
 - 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
- B. Loadbearing Studs: As specified in Section 05 40 00.
- C. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
 - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.

- 2. Material: ASTM A653/A653M steel sheet, SS Grade 50, with G60/Z180 hot dipped galvanized coating.
- 3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.
- 4. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.
- E. Tracks and Runners: Same material and thickness as studs, bent leg retainer notched to receive studs.
- F. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.
- G. Fasteners: ASTM C1002 self-piercing tapping screws.
- H. Sheet Metal Backing: 0.036 inch thick, galvanized.
- I. Anchorage Devices: Powder actuated.
- J. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
 - 1. Comply with low-emitting requirements specified in Section 01 61 16.
- K. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
 - 1. Comply with low-emitting requirements specified in Section 01 61 16.
- L. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I Inorganic.

2.3 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

3.1 INSTALLATION OF STUD FRAMING

- A. Comply with requirements of ASTM C754.
- B. Extend partition framing to structure where indicated and to ceiling in other locations.
- C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- D. 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.
- E. Align and secure top and bottom runners at 24 inches on center.
- F. Place one bead of acoustic sealant between runners and substrate, studs and adjacent construction.
- G. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- H. Install studs vertically at spacing indicated on drawings.
- I. Align stud web openings horizontally.
- J. Install bridging in the following locations at 48 inches on center veritcal:
 - 1. All partitions or chase walls that have gypsum wall board on one side only.
 - 2. All partitions that do not extend to deck.

- 3. All partitions that are installed to deck, but where gypsum wall board does not run to deck; bridging is required in the portion of the wall that does not have gypsum wall board on it.
- K. Secure studs to tracks using crimping method. Do not weld.
- L. Stud splicing is not permissible.
- M. Fabricate corners using a minimum of three studs.
- N. Double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- O. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- P. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- Q. Provide metal backup plates as required to accommodate the wall hung casework, millwork, railings or other items mounted to metal stud and wallboard walls and partitions; provide plates up to 8 feet in length as one-piece units.

3.2 CEILING AND SOFFIT FRAMING

- A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- B. Install furring independent of walls, columns, and above-ceiling work.
- C. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.
- D. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.
- E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- F. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
- G. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.
- H. Laterally brace suspension system.
- I. Contractor Option Grid Suspension System for Gypsum Board Ceilings and Bulkheads: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

3.3 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 30 00 - TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Cementitious backer board as tile substrate.
- D. Stone thresholds.
- E. Ceramic trim.
- F. Waterproofing and crack isolation membrane.

1.2 REFERENCE STANDARDS

- A. ANSI A108/A118/A136.1 American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2013.1.
 - 1. ANSI A108.1a American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2014.
 - 2. 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; 1999 (Reaffirmed 2010).
 - 3. 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 2010).
 - 4. ANSI A108.4 American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).
 - 5. 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).
 - 6. 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).
 - 7. ANSI A108.8 American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).
 - 8. ANSI A108.9 American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).
 - 9. ANSI A108.10 American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
 - 10. ANSI A108.11 American National Standard for Interior Installation of Cementitious Backer Units; 2010 (Revised).
 - 11. ANSI A108.12 American National Standard for Installation of Ceramic Tile with EGP (Exterior glue plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
 - 12. ANSI A108.13 American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2010).
 - 13. ANSI A118.4 American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).

- 14. ANSI A118.7 American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Revised).
- 15. ANSI A118.9 American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2010).
- 16. ANSI A118.15 American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2013.1.
- 17. ANSI A137.1 American National Standard Specifications for Ceramic Tile; 2013.1.
- B. TCNA (HB) Handbook for Ceramic, Glass, and Stone Tile Installation; 2015.

1.3 SUBMITTALS

- A. See Section 01 30 00 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: Mount tile and apply grout on two plywood panels, minimum 18 x 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 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.
- H. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
- I. LEED Submittals: Provide documentation of VOC content in g/L for fluid membranes, adhesives and sealants applied within the building waterproofing envelope; comply with VOC limits of Section 01 61 16.

1.4 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.

1.5 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

1.8 EXTRA MATERIALS

- A. Furnish quantity of one full box of each tile type and color selected.
- B. Turn over any cut tile exceeding 50 percent of a full tile, as extra materials.

PART 2 PRODUCTS

2.1 TILE

- A. Glazed Wall Tile: ANSI A137.1, and as follows:
 - 1. Moisture Absorption: 3.0 to 7.0 percent.
 - 2. Size and Shape: 4-1/4 inch square.
 - 3. Edges: Cushioned.
 - 4. Surface Finish: Semi-gloss.
 - 5. Colors: As selected from manufacturer's full product line including all price groups. A maximum 50 percent of wall tile will be selected from the highest price group.
 - 6. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile
 - 7. Available Manufacturers:
 - a. American Olean.
 - b. Daltile Corporation.
 - c. Florida Tile Industries.
 - d. Interceramic, USA.
- B. Paver Tile: ANSI A137.1, and as follows:
 - 1. Moisture Absorption: 0 to 0.5 percent.
 - 2. Breaking Strength: 250 pounds or better.
 - 3. Scratch Hardness: 8 MOHS or better.
 - 4. Size and Shape: 12 inch square.
 - 5. Thickness: 5/16 inch
 - 6. Face: Matte stone appearance.
 - 7. Edges: Cushioned.
 - 8. Surface Finish: Matte glazed.
 - 9. Colors: To be selected from manufacturer's standard range.
 - 10. Trim Units: Matching cove base shapes in sizes coordinated with field tile.
 - 11. Basis-of-Design: Cross-Colors by Crossville, Inc. or Porcealto by Dal-Tile.
 - 12. Color: As selected from manufacturer's full product line including all price groups. A maximum 50 percent of floor tile will be selected from the highest price group.

2.2 TRIM AND ACCESSORIES

- A. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
 - 1. Applications:
 - a. Open Edges: Bullnose.
 - b. Inside Corners: Jointed.
 - c. Floor to Wall Joints: Cove base.
 - 2. Manufacturers: Same as for tile.
- B. Thresholds: Marble, gray, honed finish; 5 inches wide by full width of wall or frame opening; 5/8 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.

1. Applications:

a. At doorways where tile terminates, unless indicated otherwise.

2.3 SETTING MATERIALS

- A. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4 or ANSI A118.15.
 - 1. Products:
 - a. ARDEX Engineered Cements: www.ardexamericas.com.
 - b. Custom Building Products: www.custombuildingproducts.com.
 - c. Bonsal American, Inc: www.sakrete.com.
 - d. Bostik Inc: www.bostik-us.com..
 - e. MAPEI Corporation.
 - f. TEC Specialty Products, Inc.

2.4 GROUTS

A. Manufacturers:

- 1. ARDEX Engineered Cements: www.ardexamericas.com.
- 2. Bonsal American, Inc: www.sakrete.com
- 3. Bostik Inc: www.bostik-us.com.
- 4. Custom Building Products: www.custombuildingproducts.com.
- 5. MAPEI Corporation.
- 6. TEC Specialty Products, Inc.
- B. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 - 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 - 3. Color(s): As selected by Architect from manufacturer's full line.

2.5 ACCESSORY MATERIALS

- A. Waterproofing and Crack Isolation Membrane: Fluid-applied acrylic-based membrane with reinforcing mesh, complying with ANSI A118.10.
 - 1. Basis-of-Design: Mapei Corporation; Mapelastic HPG with Fiberglass Mesh.
 - 2. Equivalent product of listed setting and grouting material manufacturers.
 - 3. Location: All tile floors; full coverage.
- B. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
 - 1. Product: Durock Brand Cement Board manufactured by United States Gypsum Company.
 - 2. Location: Wet walls and high-humidity areas.

C. Tile Backer Panel:

- 1. Mold-resistance: Passes ASTM D 3273.
- 2. Compliance with Standards: Meets ASTM C 1278 and meets or exceeds the physical requirements of ASTM C 630 and ASTM c 1178.
- 3. Use: Approved by manufacturer for use as tile backer panel.
- 4. No paper face.
- 5. Basis-of-Design: Fiberock Brand Aqua-Tough Interior Panel manufactured by United States Gypsum Company.
- 6. Contractor Option: DensShield Tile Backer manufactured by Georgia-Pacific.
- 7. Location: Walls not requiring cementitious backer board as specified.

D. Metal Edge Strips:

- 1. Open Edge of Tile with Adjacent Finish of Similar Height:
 - a. General: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
 - b. Basis-of-Design: 1.1 Schluter-SCHIENE Edge-protecting Profile; stainless steel.
- 2. Open Edge of Tile with Adjacent Finish of Different Height:
 - a. General: ADA-compliant profile, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
 - b. Basis-of-Design:
 - 1) 1.2 Schluter-RENO-U Reducer Profile, where tile surface is higher than adjacent finish; stainless steel.

PART 3 EXECUTION

3.1 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.
- 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.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
- D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

3.3 INSTALLATION - GENERAL

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. 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.

- E. Form internal angles square and external angles bullnosed.
- F. Install thresholds where indicated.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- L. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.
- M. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

A. Provide specified waterproofing and crack isolation membrane for all tile floor areas; install in accordance with TCA Method F122, with latex-portland cement grout.

3.5 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Mortar Bed Thickness: 5/8 inch, unless otherwise indicated.

3.6 INSTALLATION - SHOWERS AND BATHTUB WALLS

A. At tiled shower receptors install in accordance with The Tile Council of North America Handbook Method B415, mortar bed floor, and W244, thin-set over cementitious backer unit walls. Latex-Podrtland cement mortar bond coat with latex-Pordtland cement grout. Waterproof membrane turned up walls a minimum of 6 inches above finished floor.

3.7 INSTALLATION - WALL TILE

- A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244, using membrane at toilet rooms.
- B. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.
- C. Shower Walls:
 - Over interior concrete and masonry install in accordance with TCA Handbook Method W211, bonded mortar bed with latex-Portland cement bond coat; with latex-Portland cement grout.
 - 2. Include waterproofing membrane over mortar bed of W211.

3.8 CLEANING

A. Clean tile and grout surfaces.

3.9 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.
- B. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.

C. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

SECTION 09 51 00 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 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; 2013a.
- B. ASTM E1264 Standard Classification for Acoustical Ceiling Products; 2014.
- C. UL (FRD) Fire Resistance Directory; current edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items; show the following:
 - 1. Ceiling suspension system members.
 - 2. Method of attaching suspension system hangers to building structure.
 - 3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
 - 4. Minimum Drawing Scale: 1/8 inch = 1 ft.
- C. Product Data: Provide data on suspension system components.
- D. Samples: Submit two full size samples illustrating material and finish of acoustical units.
- E. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
- F. LEED Submittals: Provide documentation of VOC content in g/L for acoustical sealants applied within the building waterproofing envelope; comply with VOC limits of Section 01 61 16.
- G. LEED Submittal: EQ prerequisite 3/EQ credit 9, Acoustical Performance: Provide manufacturers documentation for the noise reduction coefficient of each acoustical finish material.

1.5 QUALITY ASSURANCE

A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL (FRD) for the fire resistance indicated.

1.6 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.

1.7 PROJECT CONDITIONS

- 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. Install acoustical units after interior wet work is dry.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size units equal to 12 cases.
 - 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrongceilings.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. USG: www.usg.com.
- B. Acoustical Units General: ASTM E1264, Class A.
 - 1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly as part of suspension system.

2.2 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrongceilings.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. Chicago Metallic Corporation: www.chicagometallic.com.
 - 4. USG: www.usg.com.
- B. Suspension Systems General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
 - 1. Profile: Tee: 15/16 inch wide face.
 - 2. Construction: Double web.
 - 3. Finish: White painted.
 - 4. Products:
 - a. Basis-of-Design: Prelude XL 15/16" by Armstrong World Industries, Inc.

2.3 EXTRUDED PERIMETER TRIM

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc; Product Axiom: www.armstrongceilings.com.
 - 2. Chicago Metallic Corporation; Product Infinity: www.chicagometallic.com.
 - 3. USG; Product Compasso: www.usg.com.
 - 4. CertainTeed Ceilings, Cloud Perimeter Trim
- B. Location:

- 1. Edge trim system for transitions between drywall and suspended ceilings.
- 2. Boundry trim system for isolated hung areas of suspended ceilings.

C. Components:

- 1. Extruded aluminum alloy 6063 trim channel.
- 2. Attachment to grid system is provided by tee-bar connection clips which lock into bosses on the trim channel and are screw-attached to the web of the intersecting suspension system members.
- 3. Sections of trim are joined together using the splice plate.

2.4 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Acoustical Sealant For Perimeter Moldings: Specified in Section 07900 and low-emitting requirements as specified in Section 01 61 16.
- D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, 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. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. 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.
- F. 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.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.
- J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Install in bed of acoustical sealant.
 - 2. Use longest practical lengths.
 - 3. Overlap and rivet corners.

K. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.2 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units with pattern parallel to longest room axis.
- D. Fit border trim neatly against abutting surfaces.
- E. Install units after above-ceiling work is complete.
- F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- G. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.
- H. Where round obstructions occur, provide preformed closures to match perimeter molding.
- I. Install hold-down clips on panels within 20 ft of an exterior door.

3.3 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.

3.4 SCHEDULE

- A. Acoustical Panels Type APC: ASTM E1264, Type III, Form 2; conforming to the following:..
 - 1. Thickness: 3/4 inch.
 - 2. Composition: Mineral.
 - 3. Light Reflectance: 0.85 or better; ASTM E1477.
 - 4. NRC Range: 0.70 or better; ASTM C423.
 - 5. CAC Range: 40 or better; ASTM E1414.
 - 6. Edge: Square.
 - 7. Surface Color: White.
 - 8. Surface Finish: Non-directional fine texture.
 - 9. Shall withstand combined effects of temperatures to 104 degrees F and relative humidity to 90 percent without visible sag.
 - 10. Ten-year warranty for sag resistance.
 - 11. Basis-of-Design Product: Armstrong World Industries, Inc.; School Zone Fine Fissured, Item #1714.
 - 12. Other Approved Manufacturers:
 - a. CertainTeed Ceilings.
 - b. USG Interiors, Inc.
 - 13. Size: 24 inches x 48 inches.
 - 14. Grid: Heavy-duty 15/16-inch exposed face.
- B. Acoustical Panels Type APC-2 and APC-3: ASTM E1264, Type IV, Form 2; conforming to the following:
 - 1. Thickness: 3/4 inch.

- 2. Composition: Mineral.
- 3. Light Reflectance: 0.90 or better; ASTM E1477.
- 4. NRC Range: 0.75 or better; ASTM C423.
- 5. CAC Range: 35 or better; ASTM E1414.
- 6. Edge: Beveled tegular.
- 7. Surface Color: White.
- 8. Surface Finish: Non-directional fine texture.
- 9. Shall withstand combined effects of temperatures to 104 degrees F and relative humidity to 90 percent without visible sag.
- 10. Ten-year warranty for sag resistance.
- 11. Basis-of-Design Product: Armstrong World Industries, Inc.; Ultima, Item #1913 and #1910.
- 12. Other Approved Manufacturers:
 - a. CertainTeed Ceilings.
 - b. USG Interiors, Inc.
- 13. Size: APC-2 24 inches x 48 inches, APC-3 24 inches x 24 inches.
- 14. Grid: Heavy-duty 15/16-inch.

END OF SECTION

SECTION 09 51 33 - ACOUSTICAL METAL PAN CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes clip-in acoustical metal pans and the following suspension system for ceilings:
 - 1. Direct-hung, partially concealed grid designed to support metal pans for Type APC4.
 - 2. Finish: Simulated wood grain.

1.2 DEFINITIONS

- A. CAC: Ceiling Attenuation Class.
- B. LR: Light Reflectance coefficient.
- C. NRC: Noise Reduction Coefficient.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below:
 - 1. Metal Pans: Set of full-size samples of each type, finish, color, pattern, and texture. Show pan edge profile.
 - 2. Exposed Suspension System Members, Moldings and Trim: Set of 12-inch-long Samples of each type, finish, and color.
 - 3. Sound Absorber: Match size of Sample metal pan.
- C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
 - 1. Ceiling suspension members.
 - 2. Method of attaching hangers to building structure.
 - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 4. Ceiling perimeter and penetrations through the ceiling; and trim and moldings.
- D. Maintenance Data: For finishes to include in maintenance manuals.

E. LEED Submittals:

- 1. Credit EQ 4.1: Manufacturers' product data for adhesive and sealants used on the interior of the building, including printed statement of VOC content.
- 2. Credit MR 4.1 and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
 - a. Contributions to this Credit include recycled content of ceiling panels, steel and aluminum.
- 3. Coordinate with Construction Waste Management requirements.
- 4. Coordinate with Construction Indoor Air Quality management Plan.
- 5. EQ prerequisite 3/EQ credit 9, Acoustical Performance: Provide manufacturers documentation for the noise reduction coefficient of each acoustical finish material.
- 6. Credit MR 5.1 and 5.2: There is a goal to achieve credit for products and material regionally manufactured, extracted, harvested or recovered.

- a. Include statement indicating cost and distance from manufacturer to Project for each regionally manufactured material.
- b. Include statement indicating cost and distance from point of extraction, harvest, or recovery to Project for each raw material used in regionally manufactured materials.

1.4 QUALITY ASSURANCE

- A. Source Limitations for Acoustical Metal Pan Ceilings: Obtain each combination of acoustical metal pans and exposed suspension systems from one source with resources to provide products of consistent quality in appearance, physical properties, and performance.
- B. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical metal pans, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Handle acoustical metal pans, suspension system components, and accessories carefully to avoid damaging units and finishes in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical metal pan ceilings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical metal pans and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Metal Pans: Full-size units equal to 2 percent of quantity installed.
 - 2. Suspension System Components: Quantity of each grid and exposed molding and trim equal to 2 percent of quantity installed.
 - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL METAL CEILING PANS

A. Materials:

- 1. Acoustical Metal Pan Standard: Provide manufacturer's standard acoustical metal pans of configuration indicated that comply with ASTM E 1264 classifications as designated by types, acoustical ratings, and light reflectances unless otherwise indicated.
 - a. Aluminum Sheet: Roll-formed aluminum sheet, complying with ASTM B 209 (ASTM B 209M); alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

- b. Electrogalvanized Steel: Fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653.
- 2. Sheet Metal Characteristics: For metal components exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, roughness, stains, or discolorations.
- 3. Sound-Absorptive Fabric Layer: Provide manufacturer's acoustic pads sized to fit concealed surface of panel. Material shall be both non-flammable and sound-absorptive.
 - a. Fire Class shall be Class A, with surface-burning characteristics for flame-spread rating of 25 or less and smoke developed rating of 50 or less. Provide independent accredited lab test results showing compliance with Class A rating as per ASTM E 84
 - b. Achieve absorption value of not less than .70 NRC. Provide independent accredited laboratory test results illustrating compliance with acoustical requirements as per ASTM C 423.
 - c. Acoustical metal panel ceilings to provide recycled cotton, in sufficient thickness to achieve NRC rating specified.
 - d. Acoustical metal panel ceilings to provide recycled fiber fleece.
 - e. Permanently laminate fleece (Install acoustical pads) to the backside of the perforated panels.

B. Acoustical Panels Type APC4:

- 1. Basis-of-Design Product: MetalWorks Vector, 6466M3 as manufactured by Armstrong World Industries.
- 2. Edge Trim Color: To be selected from manufacturers full range Effects Maple.
- 3. Surface Texture: Smooth
- 4. Composition: Metal
- 5. Color: Effects Woodgrain finish, as selected by Architect from manufacturers full range Effects Maple FXMP.
- 6. Size: 24 inches x 24 inches.
- 7. Edge Profile: Vector.
- 8. Trim Profile: Armstrong 5346, 6 inch and 5344, 4 inch Effects Wood Looks Trim.
- 9. Perforation: Armstrong M3.
- 10. Noise Reduction Coefficient (NRC): 0.70 per ASTM C 423.
- 11. Flame Spread: ASTM E 1264; Class A (FM)
- 12. Dimensional Stability: Standard
- 13. Recycle Content: Post-Consumer 0% Pre-Consumer Waste 25%

C. Infill Metal Panel Accessories:

- 1. Metal Edge Trim: Finish and Color to be selected by Architect from manufacturers full range.
- 2. 5479 BioAcoustic Infill Panel (Beige)
- 3. 6098 Edge Cap for Cut Vector Panels, color to be selected.

2.2 METAL SUSPENSION SYSTEMS

- A. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Suspension Systems: Provide systems complete with carriers, runners, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips,

load-resisting struts, and other suspension components required to support ceiling units and other ceiling-supported construction.

- 1. Structural Classification: ASTM C 635 Heavy Duty
- 2. Color: To be selected from manufacturers full range of standard colors.
- 3. Acceptable Product: Prelude XL 15/16" Exposed Tee as manufactured by Armstrong World Industries, or approved equal.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at 3 times the hanger design load indicated in ASTM C 635, Table 1, Direct Hung will be less than yield stress of wire, but provide not less than 0.106-inch diameter wire.
- E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.
- G. Exposed Metal Edge Moldings and Trim: Provide exposed members as indicated, to conceal edges of and penetrations through ceiling, to conceal edges of pans and runners, for fixture trim and adapters, for fascia at changes in ceiling height, and for other conditions; of metal and finish matching acoustical metal pan ceiling units, unless otherwise indicated.
 - 1. For Circular Penetrations of Ceiling: Fabricate edge moldings to diameter required to fit penetration exactly.
 - 2. For Suspended Edges: Effects Wood Look Trim by Armstrong or equivalent product of other named manufacturers.

2.3 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- B. VOC content must not exceed 250 g/L.

2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 GALVANIZED-STEEL SHEET FINISHES

A. Color-Coated Finish: Manufacturer's standard powder-coat baked paint complying with coating manufacturer's written instructions for surface preparation, pretreatment, application, baking, and minimum dry film thickness.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical metal pan ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical metal pan ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical metal pans to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width pans at borders, and comply with layout shown on reflected ceiling plans and Coordination Drawings.

3.3 INSTALLATION

- A. Install acoustical metal pan ceilings to comply with ASTM C 636 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved.
 - 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 7. Do not attach hangers to steel deck tabs.
 - 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 - 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical metal pans.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Cut acoustical metal pan units for accurate fit at borders and at interruptions and penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
- F. Install acoustical metal pans in coordination with suspension system and exposed moldings and trim.
 - 1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated.
 - 2. Install directionally patterned or textured metal pans in directions indicated.
 - 3. Install sound-absorbent pads in perforated metal pans.
- G. Install sound attenuation panels in areas indicated by reflected ceiling plans or room finish schedules. Lay panels directly on ceiling system and close major openings to form complete coverage in required areas. Lay second sound-absorbent pads on sound attenuation panels.

3.4 CLEANING

A. Clean exposed surfaces of acoustical metal pan ceilings, including trim and edge moldings after removing strippable, temporary protective covering, if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

END OF SECTION

SECTION 09 54 50 - FRP CEILING SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass-fiber panel ceiling system; FRP on Drawings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.2 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealers.

1.3 REFERENCE STANDARDS

- A. ASTM A 641/A 641M Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- B. ASTM C 635 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- C. ASTM C 636 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- D. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E 1264 Standard Classification for Acoustical Ceiling Products.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on each type of product indicated.
- C. Coordinate Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension members.
 - 2. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 4. Minimum Drawing Scale: 1/8 inch = 1 foot.
- D. Samples for Initial Selection: For each type of glass-fiber ceiling panel and suspension system indicated.
- E. Product Certificate: Signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- F. Maintenance Data: For finishes to include in maintenance manuals.
- G. Warranty: Special warranty specified in this Section

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide glass-fiber panel ceilings that comply with the following requirements:

- 1. Surface-Burning Characteristics: Provide glass-fiber panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
 - a. Smoke-Developed Index: 450 or less.
- C. Regulatory Requirements: Exposed surfaces meet or exceed USDA and FSIS requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver glass-fiber panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing glass-fiber panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle glass-fiber panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install glass-fiber panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 COORDINATION

A. Coordinate layout and installation of glass-fiber panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 PRODUCTS

2.1 GLASS-FIBER PANELS, GENERAL

A. Glass-fiber Ceiling System Colors: As selected by Architect from manufacturer's standard range of colors.

2.2 GLASS-FIBER CEILING PANELS

- A. Products:
 - 1. Kemlite Company, Inc.; Glasbord FX with Surfseal.
 - 2. Chicago Metallic; DynaGlass.
- B. Lay-In Ceiling Panels:
 - 1. Size: 24 by 48 inches.
 - 2. Pattern: Embossed.
 - 3. Nominal Thickness: 0.12 inch.

2.3 GLASS-FIBER SUSPENSION SYSTEMS, GENERAL

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
- B. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

2.4 GLASS-FIBER SUSPENSION SYSTEM FOR GLASS-FIBER PANEL CEILING

A. Products:

- 1. Kemlite Company, Inc.; Sanigrid II Fiberglass Ceiling Grid System.
- 2. Chicago Metallic; DynaGlass FRP Suspension Ceiling System.
- B. Suspension System: Main and cross runners formed from glass-fiber that is moisture resistant (does not support mold or mildew and will not rust or corrode).
 - 1. Wall Angles: 12-foot long length fastened directly to wall with nylon drive rivets.
 - 2. Hold-Down Clips: Provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.
 - 3. Face Design: Flat, flush.
 - 4. Accessories: Provide connector clips, wall anchors, and other accessories as required for complete installation.

2.5 SEALANT

A. Sealant: Refer to Section 07 90 00 and Section 01 61 16.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which glass-fiber panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of glass-fiber panel ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of glass-fiber panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans. Protection of In-Place Conditions:

3.3 INSTALLATION

- A. General: Install glass-fiber panel ceilings to comply with ASTM C 636, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

- 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
- 5. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of glass-fiber ceiling area and where necessary to conceal edges of glass-fiber panels.
 - 1. Apply glass-fiber sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install glass-fiber panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
 - 1. Arrange directionally patterned glass-fiber panels as follows:
 - a. Install panels with pattern running in one direction parallel to long axis of space.
 - 2. Install panels with edges fully hidden from view by flanges of suspension system runners and moldings.

3.4 CLEANING

A. Clean exposed surfaces of glass-fiber panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 64 66 - WOOD ATHLETIC FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes site finished wood strip flooring; subflooring; sheet vapor retarder and cushion pads; surface finishing and game markings; and ventilating base.
- B. Provide complete wood flooring systems for the gymnasium.

1.2 REFERENCES

- A. Maple Flooring Manufacturers Association (MFMA) MFMA Guide Specifications.
- B. Southern Pine Inspection Bureau (SPIB).
- C. Underwriters Laboratories Inc.:
 - 1. UL Fire Resistance Directory.
- D. Western Wood Products Association (WWPA).

1.3 PERFORMANCE REQUIREMENTS

A. DIN-certified - meets or exceeds all six DIN 18032-2 criteria for ball bounce, shock absorption, deflection, area of deflection, rolling load and surface friction.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate floor termination details.
 - 2. Indicate provisions for expansion and contraction, base and game insert or socket devices.
 - 3. Indicate location, size, design, and color of game markings.
- B. Product Data: Submit data for flooring and accessories, and floor finish materials.
 - 1. Include documentation of compliance with specified DIN performance requirements.
- C. Samples: Submit two samples illustrating floor finish, color, and sheen.
- D. Installer must submit references documenting approval of flooring manufacturer and showing a minimum five years of continuous applicable experience under the current company name.
- E. Submit maintenance procedures, recommended maintenance materials, suggested schedule for cleaning, stripping, and re-finishing, stain removal methods, and polishes and waxes; include three copies of AMFMA Care and Preservation of Your Wood Floors.
- F. LEED Submittal: Certificates for Credit MR 7: Chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include vendor invoice indicating Chain of Custody number and wood products listed per requirements in Section 01 60 00 Product Requirements.
- G. LEED Submittal for Credit EQ 4.1 and 4.2: Manufacturer's product data for field-applied adhesives, primers, paints and coatings in compliance with Section 01 61 16.
- H. LEED Submittal for Credit EQ 4.4: Manufacturer's product data for plywood subfloor in compliance with Section 01 61 16.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with MFMA Maple Flooring Manufacturers Association.
- B. Execute "MFMA Recommendations for Correct Preparation, Finishing and Testing of Concrete Subfloor Surfaces to Receive Wood Flooring."

C. Products: Stamp MFMA mill number and grade on underside of each piece of wood flooring at factory.

D. Qualifications:

- 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years experience.
- 2. Installer: Company specializing in performing Work of this Section with minimum five years experience and approved by the flooring manufacturer.

E. Pre-installation Conference:

- 1. Convene minimum one week prior to commencing Work of this Section.
- 2. Review installation procedures including procedures for acclimation of flooring materials.
- F. Forest Certification: Provide wood products made from forests certified by an FSC-accredited certification body. All non-FSC wood in assemblies with FSC-certified wood shall meet the FSC Controlled Wood (CW) criteria.

1.6 COORDINATION

A. Contractor to coordinate actual slab depression necessary for selected floor system, prior to pouring of slab-on-grade concrete work.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install wood flooring until overhead mechanical work and lighting are installed.
- B. Do not install wood flooring until wet construction work is complete and ambient air at installation space has moisture content stabilized between 35 and 50 percent and temperature is stabilized between 65 and 80 degrees F.
- C. Do not install floor system until concrete has been cured 60 days.
- D. Do not install wood flooring until wood materials have been acclimated to ambient temperature and humidity conditions for minimum of 72 hours; stack wood for acclimation procedures to facilitate cross-ventilation of wood materials
- E. Provide heat, light, and ventilation prior to installation.
- F. Maintain room temperature and humidity for period of two days prior to delivery of materials to installation space, during installation, and continuously after installation.

1.8 WARRANTY

A. Field Finish Flooring Systems: Warrant the Work of this Section for two years against defective or nonconforming materials and workmanship.

PART 2 PRODUCTS

2.1 AVAILABLE MANUFACTURERS

- A. Basis-of-Design: Robbins Sports Surfaces; Air Channel Star.
- B. Aacer Flooring, LLC; Anchored Power Sleeper.
- C. Equal product by Horner.

2.2 COMPONENTS

- A. Wood Strip Flooring: White Hard Maple.
 - 1. Grade: Second and better.
 - 2. Cut: Mixed grain (flat grain and edge grain).

- 3. Moisture Content: 7 to 9 percent.
- 4. Actual Thickness: 33/32 at Gym, 25/32 inch at stage.
- 5. Actual Width: 2-1/4 inches.
- 6. Edge: Tongue and Groove.
- 7. End: End matched.
- B. Tempered Hardboard: ANSI 135.4: with paintable and nailable surface, complying with the following:
 - 1. Location: Stage.
 - 2. Thickness: 0.205 inches.
 - 3. Representative Product: DURON Hardboard 22S; Masonite Corp.
- C. Flooring Nails: Type recommended by flooring manufacturer.
- D. Construction Adhesive: Type recommended by flooring manufacturer for installation of subflooring.
- E. Subflooring:
 - 1. Gymnasium: One layer of 15/32 inch thick Fir or Southern Pine plywood, APA Rated Sheathing; Exposure 1. No added urea formaldehyde resins.
 - 2. Resilient Pads: 4" x 4" neoprene pads; 24" o.c. in each direction.
 - a. Basis-of-Design: Super "W" Pads, Mson Industries, Inc.
 - 3. Sleepers: Nominal 2" x 3" x 4'-0" spruce.

2.3 ACCESSORIES

- A. Vapor Retarder: Black polyethylene sheet, 6 mil thick; 2 inch wide tape for joint sealing.
- B. Back Prime Paint: Acrylic emamel undercoater product specified in Division 9 Section "Interior Painting;" subfloor only.
- C. Ventilating Base:
 - 1. Molded rubber, 4 inches high with 3-inch toe, ventilating type, with adhesives and accessories.
 - 2. Color as selected.
 - 3. Pre-molded outside corners; neatly mitered inside corners.
 - 4. Basis-of-Design: Vent-Cove by Johnsonite.
- D. Polyurethane Floor Finish: Oil-modified type recommended by flooring manufacturer.
- E. Gameline and Logo Paint: Recommended by the finishing materials manufacturer; compatible with finish.
- F. Adhesives, primers, paints and coatings applied within the building waterproofing envelope: Comply with low-emitting requirements in Section 01 61 16.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify concrete subfloor surface is smooth and flat to plus or minus 1/8 inch in 10 feet for field finished flooring systems.
- B. Verify required floor mounted utilities are in proper location.
- C. Verify wood flooring has been acclimated to ambient temperatures, and acclimation and ambient temperatures are in accordance with flooring manufacturer's instructions.
- D. Fixed Resilient Subflooring Gymnasium:

- 1. Place vapor retarder over subfloor surface, lapping edges and ends minimum 6 inches and tape seal.
- 2. Fasten first row of system channels to concrete perpendicular to finish flooring with steel anchors driven approximately 15" on center along base of channels and within 3" of channel ends.
- 3. Place pre-assembled subfloor panels parallel to system channels, spacing end joints a minimum of 1/4". Capture exposed side edges of subfloor panels with adjacent channels. Offset channel ends 4' from adjacent rows.
- 4. Align each adjacent row of subfloor panels to form generally continuous 45-degree end joints throughout the subfloor assembly.
- 5. Provide 1-1/2" expansion voids at perimeter and at all vertical obstructions. Install solid blocking under bleachers in the stacked position, at doorways, and below portable goals.
- E. Prepare substrate to receive wood flooring in accordance with manufacturer's and MFMA instructions.
- F. Broom clean substrate.

3.2 INSTALLATION

- A. Wood Flooring:
 - 1. Install in accordance with manufacturer's and MFMA instructions; blind nail to wood sub-floor.
 - 2. Lay flooring parallel to length of room areas; verify alignment as Work progresses.
 - 3. Arrange flooring with end matched grain properly driven up and proper spacing provided for humidity conditions in region; consult manufacturer's representative.
 - 4. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
 - 5. Provide minimum 1-1/2 inch expansion space at fixed walls and other vertical interruptions; 1 inch expansion space at floor inserts.
- B. Ventilating Base: Install base at floor perimeter to cover expansion space; anchor to wall with manufacturer's screws and anchors.
- C. Polyurethane Finishing:
 - 1. Mask off adjacent surfaces before beginning sanding.
 - 2. Sanding:
 - a. Take precautions to contain dust.
 - b. Remove dust by vacuum.
 - c. Sand according to MFMA accepted methods, making your final cut with 80-100 grit paper; screen with 120 grit disc and vacuum thoroughly.
 - d. Tack the floor with clean terry cloth towels dampened with cleaning solvent until there is no dust on the towels.
 - e. Tack the floor a final time with a cleaning cloth.
 - 3. Finishing Gymnasiums: One coat sealer and two finish coats.
 - a. Apply first coat, allow 24 hours to dry and cure, then buff lightly with steel wool to remove irregularities; vacuum clean and wipe with damp cloth before applying succeeding coat.
 - b. Apply second coat; allow to dry.
 - c. Lightly buff between coats with steel wool and vacuum clean before applying succeeding coat.
 - 4. Game Lines:

- a. Apply colored games lines 2 inches wide and logo to layout indicated on Drawings.
- b. Use current rules of association having jurisdiction.
- c. Lay out in chalk or crayon and obtain approval by the Architect and the Owner before proceeding.
- d. Paint game lines in colors as selected, accurately with clean, sharp edges, using thinned coat and followed by full coat of floor enamel.
- e. Main court lines to run continuously.
- f. Burnish each line coat smooth and tack.
- 5. Apply last coat of finish.

3.3 CLEANING

A. Clean and polish floor surfaces in accordance with manufacturer's instructions.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. After 48 hours, protect areas of installed flooring subject to construction traffic with sheets of hardboard on kraft paper (taped joints).

PREPARATION

END OF SECTION

SECTION 09 65 00 - RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Resilient stair accessories.
- D. Installation accessories.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

- A. ASTM E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.
- B. ASTM F1344 Standard Specification for Rubber Floor Tile; 2015.
- C. ASTM F1861 Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).
- D. FS RR-T-650 Treads, Metallic and Nonmetallic, Skid Resistant; Federal Specifications and Standards; Revision E, 1994.
- E. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

1.4 SUBMITTALS

- A. See Section 01 30 00 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. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Verification Samples: Submit two samples, 12 by 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Certification: Submit written certification by manufacturer declaring products do not contain asbestos.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Materials: Quantity equivalent to 5 percent of each type and color.
- H. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
- I. LEED Submittals: Provide documentation of VOC content in g/L for adhesives and sealants; comply with VOC limits of Section 01 61 16.

1.5 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. 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

2.1 TILE FLOORING

- A. Bio Based Tile: Tile composed of polyester resin binder, fillers and pigments with colors and pattern dispersed uniformly throughout its thickness.
 - 1. Bio-flooring tile shall conform to the requirements of ASTM F 2982 Standard Specification for Polyester Composition Floor Tile.
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 3. Size: 12 by 12 inch.
 - 4. Thickness: 0.125 inch.
 - 5. Basis-of-Design Patterns: As follows:
 - a. BBT-1: Armstrong Migrations.
 - b. BBT-2: Armstrong Striations.
 - 6. Colors and Pattern: As selected by Architect from manufacturer's full range of colors for tile of class, wearing surface, thickness, size and pattern specified.
 - a. A maximum of 12 colors will be selected for tile; 75 percent standard colors, 25 percent premium colors.
 - b. Patterns of full size units to be provided by Architect.
 - c. Patterns requiring cutting to be expected at locations of curved ceiling patterns; curved ceiling patterns/bulkheads indicated by reflected ceiling plans to matched with floor tile installation, whether indicated or not, to be confirmed by Architect.
- B. Rubber Tile: Homogeneous color and pattern throughout thickness.
 - 1. Location: Stair landings, except where noted otherwise in the drawings.
 - 2. Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
 - 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 4. Design: Smooth.
 - 5. Size: 24 by 24 inch.
 - 6. Overall Thickness: 0.080 inch.
 - 7. Slip Resistance of Dry 0.75 and Wet 0.91 by testing method ASTM D2047 (modification).
 - 8. Other Acceptable Manufacturers:
 - a. Burke Flooring: www.burkeflooring.com.
 - b. Flexco, Inc: www.flexcofloors.com.
 - c. Johnsonite, a Tarkett Company: www.johnsonite.com.
 - d. Nora Systems, Inc.: www.nora.com/us.
 - e. NPlus: www.nplusrubber.com.
- C. High-performance Quartz Tile: Homogeneous, with color extending throughout
 - 1. thickness, and:
 - 2. Minimum Requirements: Comply with ASTM F 1066, of Class corresponding to type specified.

- 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
- 4. Size: 24 x 24 inches.
- 5. Thickness: 0.08 inch.
- 6. Pattern: Through pattern.
- 7. Colors and Pattern: As selected by Architect from manufacturer's full range of colors for tile of class, wearing surface, thickness, size and pattern specified.
 - a. A maximum of 5 colors will be selected for tile, from solid and chip design palettes.
 - b. Patterns of full size units to be provided by Architect.
 - c. Patterns requiring cutting to be expected at locations of curved ceiling patterns; curved ceiling patterns/bulkheads indicated by reflected ceiling plans to matched with floor tile installation, whether indicated or not, to be confirmed by Architect.
- 8. Performance Characteristics:
 - a. High-performance compressed composition tile containing 67 percent natural quartz particles and minimum 30 percent recycled content.
 - b. Indentation Resistance: Comply with ASTM F 1066.
- 9. High-performance Quartz Tile Products: Subject to compliance with requirements, provide one of the following:
 - a. Upofloor, Mosaic Collection; www.upofloor.com.
 - b. Procedo Versa Quartz.

2.2 STAIR COVERING

- A. Stair Treads: Rubber; full width and depth of stair tread in one piece; tapered thickness; nosing not less than 1-5/8 inch deep.
 - 1. Minimum Requirements: Comply with FS RR-T-650 requirements corresponding to type specified.
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 3. Nominal Thickness: 0.1875 inch.
 - 4. Nosing: Square.
 - 5. Style: Combined tread and riser; hammered texture tread with contrasting color abrasive grit strips full width at nosing.
 - 6. Color: Solid.
 - 7. Manufacturers:
 - a. Burke Flooring: www.burkemercer.com.
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com.
 - c. Roppe Corp: www.roppe.com.
 - d. Norament by Nora Systems, Inc.: www.nora.com/us.
 - e. NPlus: www.nplusrubber.com.

2.3 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
 - 1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 2. Height: 4 inch.
 - 3. Thickness: 0.125 inch thick.
 - 4. Finish: Satin.
 - 5. Length: Roll.

- 6. Color: Color as selected from manufacturer's standards.
- 7. Manufacturers:
 - a. Burke Flooring: www.burkemercer.com.
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com.
 - c. Roppe Corp: www.roppe.com.
 - d. Nora Systems, Inc.: www.nora.com.
 - e. NPlus: www.nplusrubber.com

2.4 ACCESSORIES

- A. Subfloor Filler: Latex-modified, portland cement based or blended hydraulic cement based formulation; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
 - 1. Comply with low-emitting requirements specified in Section 01 61 16.
- C. Moldings, Transition and Edge Strips: Metal.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 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. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive resilient flooring.
- 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.
- D. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.
- E. Verify that concrete sub-floor surfaces are ready for resilient flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
 - 1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
 - 2. Alkalinity: pH range of 5-9.
- F. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. Clean substrate.
- D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.4 TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in pattern of colors and sizes indicated.
- D. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Before installation of flooring, secure metal strips with stainless steel screws.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- G. Install flooring in recessed floor access covers. Maintain floor pattern.
- H. At movable partitions, install flooring under partitions without interrupting floor pattern.

3.5 RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. 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.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.6 STAIR COVERINGS

A. Adhere over entire surface. Fit accurately and securely.

3.7 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's instructions.
- C. Vinyl Composition Tiles: Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes if recommended in writing by manufacturer.
 - 1. Use commercially available product acceptable to manufacturer.
 - 2. Coordinate selection of floor polish with Owner's maintenance service; first application by Contractor.
 - 3. Vinyl floors to be given two coats of high water-emulsion polish; after each polish coat, buff floors to an even luster with an electric polishing machine; final polish coat application must be completed minimum 48 hours prior to Owner's occupancy.

3.8 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
- C. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

SECTION 09 67 23 - RESINOUS FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes one resinous flooring system, one with urethane body.
 - 1. Application Method: Metal, power or hand troweled.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.
- C. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- D. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.3 OUALITY ASSURANCE

- A. No request for substitution shall be considered that would change the generic type of floor system specified (i.e. Urethane mortar based system. Equivalent materials of other manufactures may be substituted only on approval of Architect or Engineer. Request for substitution will only be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section.
- B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.
 - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
 - 2. Contractor shall have completed at least 10 projects of similar size and complexity.
- C. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- D. Manufacturer Field Technical Service Representatives: Resinous flooring manufacture shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
 - 1. Field Technical Services Representatives shall be employed by the system manufacture to assist in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.
- E. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Apply full-thickness mockups on 48-inch- (1200-mm-) square floor area selected by Architect.
 - a. Include 48-inch (1200-mm) length of integral cove base.

- 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 3. Sign off from Architect and Owner/Owners agent on texture for slip resistance must be complete before installation of flooring system.

F. Pre-installation Conference:

- 1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
- 2 Attendance:
 - a. General Contractor
 - b. Architect/Owner's Representative.
 - c. Manufacturer/Installer's Representative.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
- B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.
- C. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- C. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring

1.6 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

PART 2 PRODUCTS

2.1 RESINOUS FLOORING

- A. Basis-of-Design Product: Subject to compliance with requirements:
 - 1. Stonhard, Inc.; Basis of Design: Stonclad UT®, contact Cindy Adkins, (410) 937-6765, cadkins@stonhard.com, www.stonhard.com.
- B. System Characteristics:
 - 1. Color and Pattern: Select from Mfg. Standards
 - 2. Wearing Surface: Light Texture

- 3. Integral Cove Base: TBD
- 4. Overall System Thickness: nominal 1/4 inch (6.4 mm).
- C. System Components: Manufacturer's standard components that are compatible with each other and as follows:
 - 1. Body Coat(s):
 - a. Resin: Urethane.
 - b. Formulation Description: High solids.
 - c. Application Method: Screed, Trowel.
 - 1) Thickness of Coats: 1/4 inch (6.4 mm).
 - 2) Number of Coats: One.
 - d. Aggregates: Pigmented Blended aggregate.
 - 2. Topcoat: Stonclad UT sealer.
 - a. Resin: Urethane.
 - b. Formulation Description: 100% solids.
 - c. Type: pigmented.
 - d. Finish: standard.
 - e. Number of Coats: One.
- D. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
 - 1. Compressive Strength: 7,700 psi after 7 days per ASTM C 579.
 - 2. Tensile Strength: 1,000 psi per ASTM C 307.
 - 3. Flexural Modulus of Elasticity: 2,400 psi per ASTM C 580.
 - 4. Water Absorption: 0.056% per ASTM C 413.
 - 5. Coefficient of Thermal Expansion: 1.1 x 10-5 in/in oC mm per ASTM C 531.
 - 6. Impact Resistance: >160 in. lbs. per ASTM D 4226.
 - 7. Abrasion Resistance: 0.08 gm maximum weight loss per ASTM D 4060.
 - 8. Flammability: Self-extinguishing per ASTM D 635.
 - 9. Hardness: 85 to 90, Shore D per ASTM D 2240.
 - 10. Bond Strength: 400 psi, 100 percent concrete failure per ACI 503R.

2.2 ACCESSORY MATERIALS

- A. Primer: Type recommended by manufacturer for substrate and body coats indicated. Formulation Description: Stonclad UT urethane mortar is self priming.
- B. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- C. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for Stonflex MP7 joint fill material.
- D. Metal Cove Caps: Provide at top of all cove base to transition to wall finish.

PART 3 EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.

- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 - 1. Mechanically prepare substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
 - 3. Verify that concrete substrates are dry.
 - a. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.
 - b. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 7 lb of water/1000 sq. ft. of slab in 24 hours.
 - c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.
 - 4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for Stonflex MP7 joint fill material, and CT5 concrete crack treatment.

3.2 APPLICATION

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
 - a. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.
- C. Integral Cove Base: Stonclad UR mortar, apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and top coating of cove base. Round internal and external corners. Requires Primer.
 - 1. Integral Cove Base: 6 inches high.
- D. Mortar: Mix mortar material according to manufacturer's recommended procedures.

 Uniformly spread mortar over substrate at manufacturer's recommended height using specially

- designed trowel and or Screed box. Broadcast desired light texture directly into mortar base. Field verify texture needed
- E. Apply topcoat in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 CLEANING, PROTECTING, AND CURING

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 18 hours.
- B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.
- C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer

END OF SECTION

SECTION 09 68 13 - TILE CARPETING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Carpet tile, fully adhered.

1.2 REFERENCE STANDARDS

- A. ASTM D2859 Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2006 (Reapproved 2011).
- B. ASTM E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.
- C. CRI (CIS) Carpet Installation Standard; Carpet and Rug Institute; 2011.
- D. CRI 104 Standard for Installation of Commercial Textile Floorcovering Materials; Carpet and Rug Institute; 2002.
- E. CRI (GLA) Green Label Testing Program Approved Adhesive Products; Carpet and Rug Institute; Current Edition.
- F. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate layout of joints.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Submit two, 12 inch long samples of edge strip.
- F. LEED Submittals:
 - 1. Submit data documenting VOC content in g/L of carpet tile adhesives; copy of current CRI Approved Products Listing is acceptable.
 - 2. Credit EQ 4.3: Certification of compliance with the Carpet and Rug Institute "Green Label Plus" Indoor Air Quality Testing requirements for carpet.
- G. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 60 00.
 - 1. Credit MR 4.1 and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - 2. Credit MR 5: Product Data indicating location of manufacture and location of extraction or recovery of primary raw materials. Include statement indicating costs for each product having regional content.
- H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed, with a minimum of 1 full box of each type, color, and pattern.

1.4 INSTALLER QUALIFICATIONS

- A. Company specializing in performing Work of this Section with minimum five years experience.
- B. Installers trained, accepted and certified by the carpet manufacturer, or FCIB, IFCI or CRI certified carpet installers.

1.5 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.
- B. Coordinate with requirements of Section 01 57 21.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Tandus: www.tandus.com.
- B. Interface, Inc: www.interfaceinc.com.
- C. Milliken & Company: www.milliken.com.

2.2 MATERIALS

- A. Tile Carpeting: Tufted Textured Loop, manufactured in one color dye lot.
 - 1. Basis-of-Design Product: Quizbowl manufactured by Interface, Inc..
 - 2. Tile Size: 20 x 20 inch, nominal.
 - 3. Color: To be selected from manufacturer's full line, up to 4 colors will be chosen.
 - 4. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
 - 5. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 - 6. Max. Electrostatic Charge: 3.5 Kv. at 20 percent relative humidity.
 - 7. Primary Backing Material: GlasBac RE.

2.3 ACCESSORIES

- A. Sub-Floor Filler: Cementitious type; type recommended by flooring material manufacturer.
- B. Edge Strips: Rubber, color as selected by Architect.
- C. Adhesives: Acceptable to carpet tile manufacturer, compatible with materials being adhered; maximum VOC of 50 g/L; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- B. Vacuum clean substrate.

3.3 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions and CRI (CIS).
- C. Install carpet tile in accordance with manufacturer's instructions and CRI 104.
- D. Blend carpet from different cartons to ensure minimal variation in color match.
- E. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- F. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- G. Locate change of color or pattern between rooms under door centerline.
- H. Fully adhere carpet tile to substrate.
- I. Trim carpet tile neatly at walls and around interruptions.
- J. Complete installation of edge strips, concealing exposed edges.

3.4 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 84 00 - ACOUSTIC ROOM COMPONENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fabric-covered fiberglass core panels and mounting accessories.
- B. Cementitious wood fiber wall panels.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

- A. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2009a.
- B. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- C. ASTM E795 Standard Practices for Mounting Test Specimens During Sound Absorption Tests; 2005 (Reapproved 2012).

1.4 SUBMITTALS

- A. See Section 01 30 00 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. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.
- E. Verification Samples: Fabricated samples of each type of panel specified; 12 by 12 inch, showing construction, edge details, and fabric covering.
- F. LEED Submittal: EQ prerequisite 3/EQ credit 9, Acoustical Performance: Provide manufacturers documentation for the noise reduction coefficient of each acoustical finish material
- G. LEED Submittal: Provide documentation of recycled content and location of manufacture; include product data indicating wall system low-emitting requirements as specified in Section 01 61 16.

1.5 QUALITY ASSURANCE

A. Warranty Period for Cementitious Wood Fiberboard Wall Panels: Lifetime.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical panels from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until panels are needed for installation.
- B. Store panels flat, in dry, well-ventilated space; do not stand panels on end.
- C. Protect panel edges from damage.
- D. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 Specifications.

PART 2 PRODUCTS

2.1 FABRIC-COVERED ACOUSTICAL PANELS (Type AWP2)

A. Manufacturers:

- 1. Basis-of-Design: Kinetics Noise Control; High-Impact Hardside Panels.
- 2. Conwed Designscape an Owens Corning Company.
- 3. Essi Acoustical Products.
- 4. Panel Solutions, Inc.
- 5. Sound Concepts Acoustical Products.
- 6. Wall Technology, Inc.
- B. Panels: Prefinished, factory assembled fabric-covered panels.
 - 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.

C. Fiberglass Core Panels:

- 1. 1/8-inch- thick layer of compressed molded glass-fiber board with a minimum nominal density of 16 to 18 lb/cu. ft. laminated to face of core.
- 2. Core Density: 6 to 7 lb/cu ft.
- 3. Noise Reduction Coefficient (NRC): Not less than 0.90 for 2-inch panel, when tested in accordance with ASTM C423 for Type A mounting, per ASTM E795.
- 4. Corners: Square.
- 5. Mounting: Back mounting.
- D. Fabric Covering: Seamless fabric facing material, for stretched covering of core material.
 - 1. Manufacturer: Guilford of Maine.
 - 2 Product Line/Pattern: FR-701
 - 3. Color: As selected from full color line.
 - 4. Fiber Content: 100 percent woven polyester.
 - 5. Applied Treatments: Stain resistance.

2.2 CEMENTITIOUS WOOD FIBERBOARD WALL PANELS (Type AWP1)

- A. Manufacturer: Tectum, Inc.
- B. Cementitious Wood Fiberboard Wall Panels: Manufacturer's standard panel construction consisting of a cementitious wood fiberboard attached directly to wall; to be field painted, and complying with the following requirements:
 - 1. Panel Thickness: 2 inches
 - 2. Finish: Natural for field painting; minimum 4 different colors.
 - 3. Panel Widths: As indicated.
 - 4. Edge Detail: Beveled.
 - 5. Panel Lengths: As indicated.
 - 6. Noise Reduction Coefficient: NRC of not less than 0.60.
 - 7. Binders: Composite wood product shall be produced with binders containing no urea-formaldehyde.

2.3 FABRICATION

- A. Fabric Wrapped, General: Fabricate panels to sizes and configurations indicated, with fabric facing installed without sagging, wrinkles, blisters, or visible seams.
- B. Resin harden perimeter edges and areas of core for attachment of mounting brackets.

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.

2.4 ACCESSORIES

- A. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support, designed to allow panel removal, and as follows:
 - 1. Two-part clip and base-support bracket system; brackets designed to support full weight of panels and clips designed for lateral support, with one part mechanically attached to back of panel and the other attached to substrate.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install acoustical panels in locations indicated, following installation recommendations of panel manufacturer. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
- B. Install panels to construction tolerances of plus or minus 1/16 inch for the following:
 - 1. Plumb and level.
 - 2. Flatness.

3.2 CLEANING

- A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.
- B. Remove surplus materials, trimmed portions of panels, and debris resulting from installation.

3.3 PROTECTION

- A. Provide protection of installed acoustical panels until completion of the work.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete masonry unites (CMU).
 - 2. Steel.
 - 3. Galvanized metal.
 - 4. Wood.
 - 5. Gypsum board.
 - 6. Wood fiber acoustical panels.
 - 7. Cotton or canvas insulation coverings.
 - 8. Exposed PVC piping.
 - 9. Hardboard floor surface.
 - 10. GFRC fabrications.
 - 11. GFRG fabrications.GFRG fabrications.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures, project meetings, progress schedules and documentation, reports, coordination.

1.3 DEFINITIONS

A. Gloss Ranges:

- 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
- 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
- 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
- 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D 3359 Standard Test Methods for Mearsuring Adhesion by Tape.
- C. SSPC (PM1) Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings.

1.5 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for each type of product submitted.
- C. LEED Submittal: Product data for Credit IEQ 4.2: For paints and coatings applied within the building waterproofing envelope, documentation including printed statement of VOC contents in g/L.
- D. Samples for Initial Selection: Submit each type of topcoat product indicated.

- E. Samples for Verification: Submit each type of paint system and each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, minimum 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- F. Product List: Submit each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- G. Maintenance Materials: Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 percent, but not less than 2 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.7 MOCK-UP

- A. Benchmark Samples (Mock-ups): Provide benchmark finish sample (all coats) for each coating type and substrate.
 - Architect will select several rooms or surfaces to represent surfaces and conditions, for application of each paint system type and substrate; colors will be provided for Benchmark Samples.
 - a. Wall Surfaces: Complete minimum 100 square feet.
 - b. Small Areas and Items: Apply systems to items designated by the Architect.
 - 2. Complete Benchmark Samples per the requirements of this Section.
 - a. Provide required sheen, color and texture for each surface.
 - b. Architect-accepted Benchmark Samples to establish level of quality for remainder of Work.
 - 3. Architect to provide final color approvals from Benchmark Samples and intermediate coat wall colors; refer to subsection 3.3 of this Section.
 - 4. Benchmark samples to be prepared by individuals performing the remaining Work for this Project.

1.8 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. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F and a maximum 90 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.9 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Benjamin Moore & Co.
- B. Glidden Professional.
- C. PPG Industries.
- D. Sherwin-Williams Company.
- E. McCormick Paints.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions; these requirements do not apply to primers or finishes that are applied in a fabrication or finishing shop:
 - 1. Flat Paints: VOC content of not more than 50 g/L.
 - 2. Nonflat Paints and Paint Primers: VOC content of not more than 150 g/L.

C. Colors:

- 1. As selected by Architect from manufacturer's full range.
- 2. Different colors may be used in the same room.
- 3. Colors of frames may be different than doors.
- 4. Colors for ceilings and trim may be different from walls, and walls may be more than one color or striped.
- 5. Dark tints may be used on metal frames that may require more coats than that indicated on paint schedule for proper coverage; apply as many coats as necessary for complete hide.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Wood: 15 percent.

- 2. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions [and compatibility with existing finishes and primers].
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions

3.2 PREPARATION

- A. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. Use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- C. Seal surfaces that might cause bleed through or staining of topcoat.
- D. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- E. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.
- F. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- G. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Passivated Galvanized Steel: Clean with a water-based industrial strength cleaner, and/or "Brush Blast" in accordance with SSPC-SP7. After the surface has been prepared, apply recommended primer to a small area. Allow primer to cure for 7 days, and test adhesion using the "cross-hatch adhesion tape test" method in accordance with ASTM D 3359. If the adhesion of the primer is positive, proceed with a recommended coating system for galvanized metal.
- J. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth

L. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 COLOR COORDINATION

- A. Tint intermediate coats for wall surfaces to match color sample selections.
- B. Architect will visit the Project within 7 days after notification, to review primed walls for final color coordination.
- C. Allow 3 week days in schedule for Architect to change final wall colors between intermediate coat and remaining coat(s).
- D. Allow time to order final paint colors; do not order final paint colors until obtaining final color approvals.

3.4 APPLICATION

- A. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 - 2. Wall Surfaces: Receive final color approvals following Architect's review of Intermediate Coats, before proceeding.
 - 3. Omit primer over metal surfaces that have been shop primed and touchup painted.
 - 4. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 - 5. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- B. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
 - a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 - 3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 5. Finish doors on tops, bottoms, and side edges the same as faces.

C. Block Fillers:

- 1. Apply two coats of block filler to concrete masonry block at a rate to ensure complete coverage with pores filled.
- 2. Perform a squeegee operation on second coat to fill all crevices and produce a smooth surface; do not remove filler material from surface with the squeegee operation.
- D. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
 - 1. Wall Surfaces: Tint Prime Coat a lighter shade to facilitate identification; tint Prime Coat to match color of finish coat, but provide sufficient difference in shade to distinguish Prime Coat from Intermediate Coat used for final color selections.
 - Other Surfaces: Tint each undercoat a lighter shade to facilitate identification of each
 coat if multiple coats of same material are to be applied. Tint undercoats to match color
 of topcoat, but provide sufficient difference in shade of undercoats to distinguish each
 separate coat.
- E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- F. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- G. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- H. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
 - d. Exposed wiremold and conduit in all finished spaces to match color of wall.
- I. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following factory-finished components:

- a. Architectural woodwork.
- b. Acoustical wall panels.
- c. Metal toilet enclosures.
- d Metal lockers
- e. Elevator entrance doors and frames.
- f. Elevator equipment.
- g. Finished mechanical and electrical equipment.
- h. Light fixtures.
- 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Foundation spaces.
 - b. Furred areas.
 - c. Ceiling plenums.
 - d. Utility tunnels.
 - e. Pipe spaces.
 - f. Duct shafts.
 - g. Elevator shafts.
- 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper and copper alloys.
 - e. Bronze and brass.
- 4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
- 5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- 6. Items indicated to receive other finishes.
- 7. Items indicated to remain unfinished.
- 8. Floors, unless specifically so indicated.
- 9. Ceramic and other tiles.
- 10. Acoustical materials, unless specifically so indicated.

3.5 CLEANING AND PROTECTION

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

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. Institutional Low-Odor/VOC Latex System: Eggshell Finish.
 - . Prime Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Latex Primer (N534); Benjamin Moore & Co.
 - 2) Interior Acrylic Enamel Undercoater DU00004123; Duron, Inc.
 - 3) Ultra-Hide 250 Primer 1402; Glidden Professional.
 - 4) PERMA-CRETE 4-603 Interior/Exterior Alkali Resistant Primer; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Interior Latex Primer, B28W2600; Sherwin-Williams Company.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Latex Eggshell Finish (N538); Benjamin Moore & Co.
 - Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Interior Latex Eg-Shel, B28-2600 Series; Sherwin-Williams Company.
 - c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).
 - 1) Ultra Spec 500 Interior Latex Eggshell Finish (N538); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Interior Latex Eg-Shel, B28-2600 Series; Sherwin-Williams Company.
- B. Concrete Substrates, Traffic Surfaces:
 - 1. Refer to Division 9 Section "High-Performance Coatings."
- C. Clay-Masonry Substrates:
 - 1. Institutional Low-Odor/VOC Latex System:
 - a. Prime Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Latex Primer (N534); Benjamin Moore & Co.
 - 2) Interior Acrylic Enamel Undercoater DU00004123; Duron, Inc.
 - 3) Ultra-Hide 250 Primer; Glidden Professional.
 - 4) PERMA-CRETE 4-603 Interior/Exterior Alkali Resistant Primer; PPG Industries.
 - 5) ProMar 200 Zero VOC Interior Latex Primer, B28W2600 Series; Sherwin-Williams Company.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Latex Eggshell Finish (N538); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.

- 5) ProMar 200 Zero VOC Interior Latex Eg-Shel B28-2600; Sherwin-Williams Company.
- c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).
 - 1) Ultra Spec 500 Interior Latex Eggshell finish (N538); Benjamin Moore & Co.
 - Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-2600 Series; Sherwin-Williams Company.

D. CMU Substrates:

- 1. Institutional Low-Odor/VOC Latex System:
 - a. Prime Coat: Interior/exterior latex block filler.
 - 1) Latex Block Filler 285; Benjamin Moore & Co.
 - 2) Duron Block Kote Latex Block Filler, DU0008128; Duron, Inc.
 - 3) Concrete Coatings Block Filler Interior/Exterior Primer 3010-1200; Glidden Professional.
 - 4) SPEEDHIDE 6-7 Interior/Exterior Masonry Latex Block Filler; PPG Industries.
 - 5) S-W PrepRite Block Filler, B25W25; Sherwin-Williams Company (The).
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Latex Eggshell Finish (N538); Benjamin Moore & Co.
 - Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Eg-Shel, B20-2600 Series; Sherwin-Williams Company.
 - c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).
 - 1) Ultra Spec 500 Interior Latex Eggshell Finish (538); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Eg-Shel, B20-2600; Sherwin-Williams Company.
- E. Spot Prime for Field Connections and Touch Up for Structural Elements:
 - 1. Thoroughly examine structural elements for bare spots and abraded surface; spot prime for full coverage.
 - 2. Extend spot prime minimum 6 inches beyond edge of field connections.
 - 3. Waterborne Enamel System:
 - a. Prime Coat:
 - 1) SUPER SPEC HP Acrylic Metal Primer P04; Benjamin Moore & Co.
 - 2) ProCryl Universal Primer, B66-310 Series; Duron, Inc.
 - 3) Devflex 4020PF Direct to Metal Primer & Flat Finish; Glidden Professional.
 - 4) Pitt-Tech Plus 90-912 Interior/Exterior DTM Industrial Metal Primer; PPG Industries.

5) Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series; Sherwin-Williams Company.

F. Steel Substrates:

- 1. Quick-Drying Enamel System: Shop prime.
 - a. Prime Coat: Quick-drying alkyd metal primer.
 - 1) SUPER SPEC Shop-Coat Alkyd Metal Primer P14; Benjamin Moore & Co.
 - 2) Kem Bond HS Universal Metal Primer, B50NZ3 Series; Duron, Inc.
 - 3) Devflex 4020PF Direct to Metal Primer & Flat Finish; Glidden Professional.
 - 4) Pitt-Tech Plus 90-912 Interior/Exterior DTM Industrial Metal Primer; PPG Industries.
 - 5) Kem Bond HS Universal Metal Primer, B50NZ3 Series; Sherwin-Williams.
- 2. Water-Based Dry-Fall System:
 - a. Prime Coat: Waterborne dry fall.
 - 1) Super Spec Sweep-UP Latex Flat (153); Benjamin Moore & Co.
 - 2) ProCryl Universal Primer, B66-310 Series; Duron, Inc.
 - 3) Devflex 4020PF Direct to Metal Primer & Flat Finish; Glidden Professional.
 - 4) Pitt-Tech Plus 90-912 Interior/Exterior DTM Industrial Metal Primer; PPG Industries.
 - 5) S-W ProCryl Universal Primer, B66-310 Series; Sherwin-Williams Company.
 - b. Intermediate Coat:
 - 1) Eggshell Finish Not Available; Benjamin Moore & Co.
 - 2) Waterborne Acrylic Dry Fall Low VOC, B42W82; Duron, Inc.
 - 3) Waterborne Dryfall Eggshell 1482-1200; Glidden Professional.
 - 4) SPEEDHIDE-SUPER TECH WB- 6-724XI (Low Sheen Semi Gloss) or 6-725XI (flat) Interior 100% Acrylic Latex Dry-Fog; PPG Industries.
 - 5) S-W Waterborne Acrylic Dry Fall, Low VOC, B42W82; Sherwin-Williams Company.
 - c. Topcoat: Waterborne dry fall.
 - 1) Eggshell Finish Not Available; Benjamin Moore & Co.
 - 2) Waterborne Acryclic Dry Fall Low VOC, B42W82; Duron, Inc.
 - 3) Waterborne Dryfall Eggshell 1482-1200; Glidden Professional.
 - 4) SPEEDHIDE-SUPER TECH WB- 6-724XI (Low Sheen Semi Gloss) or 6-725XI (flat) Interior 100% Acrylic Latex Dry-Fog; PPG Industries.
 - 5) S-W Waterborne Acrylic Dry Fall, Low VOC, B42W82; Sherwin-Williams Company.
- 3. Institutional Low-Odor/VOC Latex System (Field Primed): Eggshell finish.
 - a. Prime Coat Field Applied: (shop prime with Quick-Drying Enamel System)
 - 1) Super Spec Acrylic Metal Primer (P04); Benjamin Moore & Co.
 - 2) ProCryl Universal Primer, B66-310 Series; Duron, Inc.
 - 3) : Glidden Professional.
 - 4) Pitt-Tech Plus 90-912 Interior/Exterior DTM Industrial Metal Primer; PPG Industries.
 - 5) S-W ProCryl Universal Primer, B66-310 Series; Sherwin-Williams Company.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Latex Eggshell Finish (N538); Benjamin Moore & Co.
 - Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Ultra-Hide 250 Interior Eggshell 1402; Glidden Professional.

- 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
- 5) S-W ProMar 200 Zero VOC Interior Latex Eg-Shel B20-2600 Series; Sherwin-Williams Company.
- c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).
 - 1) Ultra Spec 500 Interior Latex Eggshell Finish (N538); Benjamin Moore & Co.
 - Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Ultra-Hide 250 Interior Eggshell 1402; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Interior Latex Eg-Shel B20-2600 Series; Sherwin-Williams Company.
- 4. Waterborne High-Performance Gloss Enamel System: Handrails and railing systems; and items indicated to be gloss finish.
 - a. Prime Coat Field Applied: (shop prime with Quick-Drying Enamel System).
 - 1) SUPER SPEC HP Acrylic Metal Primer P04; Benjamin Moore & Co.
 - 2) DTM Wash Primer (Galvanized) or WB Tile-Clad Primer (Steel); Duron, Inc.
 - 3) Devflex 4020PF Direct to Metal Primer & Flat Finish; Glidden Professional.
 - 4) Pitt-Tech Plus 90-912 Interior/Exterior DTM Industrial Metal Primer; PPG Industries.
 - 5) DTM Wash Primer (Galvanized) or WB Tile-Clad Primer (Steel); Sherwin-Williams Company.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - 1) SUPER SPEC HP Waterborne Urethane Gloss Enamel P73; Benjamin Moore & Co.
 - 2) Waterbased Acrolon 100 Urethane, B65W720 Series; Duron, Inc.
 - 3) Devflex 4216HP Waterborne Acrylic Semi-Gloss Enamel 4216L Series; Glidden Professional.
 - 4) Pitt-Tech Plus 90-1310 series Interior/Exterior High Gloss DTM Industrial Enamel; PPG Industries.
 - 5) S-W Waterbased Acrolon 100 Urethane, B65W720 Series; Sherwin-Williams Company.
 - c. Topcoat: Interior latex (eggshell).
 - 1) ; Benjamin Moore & Co.
 - 2) Waterbased Acrolon 100 Urethane, B65W720 Series; Duron, Inc.
 - 3) : Glidden Professional.
 - 4) Pitt-Tech Plus 90-1310 series Interior/Exterior High Gloss DTM Industrial Enamel; PPG Industries.
 - 5) S-W Waterbased Acrolon 100 Urethane, B65W720 Series; Sherwin-Williams Company.
- G. Galvanized-Metal Substrates:
 - 1. Water-Based Dry-Fall System:
 - a. Prime Coat: Waterborne dry fall.
 - 1) Super Spec Sweep-Up Latex Flat (153); Benjamin Moore & Co.
 - 2) Waterbased Acrylic Dry Fall Low VOC B42W82; Duron, Inc.
 - 3) Waterborne Dryfall Eggshell 1482-1200; Glidden Professional.

- 4) SPEEDHIDE-SUPER TECH WB- 6-724XI (Low Sheen Semi Gloss) or 6-725XI (flat) Interior 100% Acrylic Latex Dry-Fog; PPG Industries.
- 5) S-W Waterborne Acrylic Dry Fall, Low VOC B42W82; Sherwin-Williams Company.
- b. Topcoat: Waterborne dry fall.
 - 1) Eggshell Finish Not Available; Benjamin Moore & Co.
 - 2) Waterbased Acrylic Dry Fall Low VOC B42W82; Duron, Inc.
 - 3) Waterborne Dryfall Eggshell 1482-1200; Glidden Professional.
 - 4) SPEEDHIDE-SUPER TECH WB- 6-724XI (Low Sheen Semi Gloss) or 6-725XI (flat) Interior 100% Acrylic Latex Dry-Fog; PPG Industries.
 - 5) S-W Waterborne Acrylic Dry Fall Low VOC, B42W82; Sherwin-Williams Company.
- 2. Quick-Drying Enamel System: Shop prime.
 - a. Prime Coat: Quick-drying alkyd metal primer.
 - SUPER SPEC HP Universal Metal Primer P07; Benjamin Moore & Co.
 - 2) Kem Bond HS Universal Primer B50NZ3 Series; Duron, Inc.
 - 3) Devflex 4020PF Direct to Metal Primer & Flat Finish; Glidden Professional.
 - 4) Pitt-Tech Plus 90-912 Interior/Exterior DTM Industrial Metal Primer; PPG Industries.
 - 5) Kem Bond HS Universal Primer B50NZ3 Series; Sherwin-Williams Company.
- 3. Institutional Low-Odor/VOC Latex System Over Waterborne Primer System: Semigloss finish.
 - a. Prime Coat Field Applied: (shop prime with Quick-Drying Enamel System)
 - 1) SUPER SPEC HP Acrylic Metal Primer P04; Benjamin Moore & Co.
 - 2) ProCryl Universal Primer, B66-310 Series; Duron, Inc.
 - 3) Devflex 4020PF Direct to Metal Primer & Flat Finish; Glidden Professional.
 - 4) Pitt-Tech Plus 90-912 Interior/Exterior DTM Industrial Metal Primer; PPG Industries.
 - 5) S-W ProCryl Universal Primer, B66-310 Series; Sherwin-Williams Company.
 - Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Semi-gloss Finish (N539); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Semi-Gloss Enamel, DU0035 Series; Duron, Inc.
 - 3) Lifemaster Interior Semi-Glass 9200; Glidden Professional.
 - 4) SPEEDHIDE 6-500 series Interior Semi-Gloss Acrylic Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Semi-gloss, B31-2600 Series; Sherwin-Williams Company.
 - c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).
 - 1) Ultra Spec 500 Interior Semi-Gloss Finish (N539); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Semi-Gloss Enamel, DU0035 Series; Duron, Inc.
 - 3) Lifemaster Interior Semi-Gloss 9200; Glidden Professional.
 - 4) SPEEDHIDE 6-500 series Interior Semi-Gloss Acrylic Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Semi-Gloss, B31-2600 Series; Sherwin-Williams Company.
- 4. Waterborne High-Performance Gloss Enamel System: Provide for interior railing systems and exposed steel stair risers.
 - a. Prime Coat Field Applied: (shop prime with Quick-Drying Enamel System).

- 1) SUPER SPEC HP Acrylic Metal Primer P04; Benjamin Moore & Co.
- 2) DTM Wash Primer (Galvanized) or WB Tile-Clad Primer (Steel); Duron, Inc.
- 3) Devflex 4020PF Direct to Metal Primer & Flat Finish; Glidden Professional.
- 4) Pitt-Tech Plus 90-912 Interior/Exterior DTM Industrial Metal Primer; PPG Industries.
- 5) DTM Wash Primer (Galvanized) or WB Tile-Clad Primer (Steel); Duron, Inc.
- b. Intermediate Coat: Interior urethane matching topcoat.
 - SUPER SPEC HP Waterborne Urethane Gloss Finish P73; Benjamin Moore & Co.
 - 2) Waterbased Acrolon 100 Urethane, B65W720 Series; Duron, Inc.
 - 3) Devflex 4216HP Waterborne Acrylic Semi-Gloss Enamel 4216L Series; Glidden Professional.
 - 4) Pitt-Tech Plus 90-1310 series Interior/Exterior High Gloss DTM Industrial Enamel; PPG Industries.
 - 5) S-W Waterbased Acrolon 100 Urethane, B65W720 Series; Sherwin-Williams Company (The).
- c. Topcoat: Interior latex (gloss).
 - SUPER SPEC HP Waterborne Urethane Gloss Finish P73; Benjamin Moore & Co.
 - 2) Waterbased Acrolon 100 Urethane, B65W720 Series; Duron, Inc.
 - 3) Devflex 4216HP Waterborne Acrylic Semi-Gloss Enamel 4216L Series; Glidden Professional.
 - 4) Pitt-Tech Plus 90-1310 series Interior/Exterior High Gloss DTM Industrial Enamel; PPG Industries.
 - 5) S-W Waterbased Acrolon 100 Urethane, B65W720 Series; Sherwin-Williams Company (The).

H. Dimensional and Dressed Lumber Substrates:

- 1. Institutional Low-Odor/VOC Latex System: Semigloss finish.
 - a. Prime Coat: Interior latex-based wood primer.
 - 1) Ultra Spec 500 Latex Primer (N534); Benjamin Moore & Co.
 - 2) Interior Acrylic Enamel Uncercoater DU0004123; Duron, Inc.
 - 3) Gripper Interior/Exterior Primer-Sealer 3210-1200; Glidden Professional.
 - 4) SEAL Grip 17-921 Interior/Exterior 100% Acrylic Universal Primer/Sealer; PPG Industries.
 - 5) S-W PrepRite® ProBlock® Latex Primer, B51 Series; Sherwin-Williams Company.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Semi-Gloss Finish (N539); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Semi-Gloss Enamel, DU0035 Series; Duron, Inc.
 - 3) Lifemaster Interior Semi-Gloss 9200; Glidden Professional.
 - 4) SPEEDHIDE 6-500 series Interior Semi-Gloss Acrylic Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Semi-Gloss, B31-2600 Series; Sherwin-Williams Company.
 - c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).
 - Ultra Spec 500 Interior Semi-Gloss Finish (N539); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Semi-Gloss Enamel, DU0035 Series; Duron, Inc.

- 3) Lifemaster Interior Semi-Gloss 9200; Glidden Professional.
- 4) SPEEDHIDE 6-500 series Interior Semi-Gloss Acrylic Latex; PPG Industries.
- 5) S-W ProMar 200 Zero VOC Semi-Gloss, B31-2600 Series; Sherwin-Williams Company.

I. Wood Panel Substrates:

- 1. Institutional Low-Odor/VOC Latex System: Semigloss finish.
 - a. Prime Coat: Interior latex-based wood primer.
 - 1) Ultra Spec 500 Interior Primer (N534); Benjamin Moore & Co.
 - 2) Interior Acrylic Enamel Undercoater DU0004123; Duron, Inc.
 - 3) Gripper Interior/Exterior Primer-Sealer 3210-1200; Glidden Professional.
 - 4) SEAL Grip 17-921 Interior/Exterior 100% Acrylic Universal Primer/Sealer; PPG Industries.
 - 5) ProBlock® Latex Primer, B51 Series; Sherwin-Williams Company.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Semi-Gloss Finish (N539); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Semi-Gloss Enamel, DU0035 Series; Duron, Inc.
 - 3) Lifemaster Interior Semi-Glass 9200; Glidden Professional.
 - 4) SPEEDHIDE 6-500 Series Interior Semi-Gloss Acrylic Latex; PPG Industries.
 - 5) ProMar 200 Zero VOC Int. Latex S/G B31-2600; Sherwin-Williams Company.
 - c. Topcoat: Institutional low-odor/VOC interior latex.
 - 1) Ultra Spec 500 Interior Semi-Gloss Finish (N539); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Semi-Gloss Enamel, DU0035 Series; Duron, Inc.
 - 3) Lifemaster Interior Semi-Gloss 9200; Glidden Professional.
 - 4) SPEEDHIDE 6-500 series Interior Semi-Gloss Acrylic Latex; PPG Industries.
 - 5) ProMar 200 Zero VOC Int. Latex S/G B31-2600; Sherwin-Williams Company.

J. Gypsum Board Substrates:

- . Institutional Low-Odor/VOC Latex System: Eggshell finish.
 - a. Prime Coat: Interior latex primer/sealer.
 - 1) Ultra Spec 500 Interior Primner (N534); Benjamin Moore & Co.
 - 2) Interior Latex Drywall Primer DU0004125; Duron, Inc.
 - 3) High Hide Interior Primer Sealer 1000-1000; Glidden Professional.
 - 4) SPEEDHIDE 6-2 Interior Latex Sealer Quick-Drying; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Interior Latex Primer, B28W2600; Sherwin-Williams Company.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Eggshell Finish (N538); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Eg-Shel, B20-2600 Series; Sherwin-Williams Company.
 - c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).
 - Ultra Spec 500 Interior Eggshell Finish (N538); Benjamin Moore & Co.

- Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
- 3) Lifemaster Interior Eggshell 9300; Glidden Professional.
- 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
- 5) S-W ProMar 200 Zero VOC Eg-Shel B20-2600; Sherwin-Williams Company.
- 2. Institutional Low-Odor/VOC Latex System: Flat finish; ceilings.
 - a. Prime Coat: Interior latex primer/sealer.
 - 1) Ultra Spec 500 Interior Primer (N534); Benjamin Moore & Co.
 - 2) Interior Latex Drywall Primer DU0004125; Duron, Inc.
 - 3) High Hide Interior Primer Sealer 1000-1000; Glidden Professional.
 - 4) SPEEDHIDE 6-2 Interior Latex Sealer Quick-Drying; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Interior Latex Primer, B28SW2600; Sherwin-Williams Company.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Flat Finish (N536); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Flat, DU144 Series; Duron, Inc.
 - 3) Lifemaster Interior Flat 9100; Glidden Professional.
 - 4) SPEEDHIDE 6-70 series Interior Latex Flat; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Flat, B30-2600; Sherwin-Williams Company.
 - c. Topcoat: Institutional low-odor/VOC interior latex (flat).
 - 1) Eco Spec WB Interior Latex Flat, 373; Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Flat, DU144 Series; Duron, Inc.
 - 3) Ultra-Hide 250 Flat Latex Paint 1200N Series; Glidden Professional.
 - 4) SPEEDHIDE 6-70 series Interior Latex Flat; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Flat, B30-2600; Sherwin-Williams Company.

K. Wood Fiber Acoustical Panels:

- 1. Institutional Low-Odor/VOC Latex System: Eggshell finish.
 - a. Prime Coat: Factory primed.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Primer (N534); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Eg-Shel, B20-2600; Sherwin-Williams Company.
 - c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).
 - 1) Ultra Spec 500 Interior Eggshell Finish (N538); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) S-W ProMar 200 Zero VOC Eg-Shel, B20-2600; Sherwin-Williams Company.
- L. Cotton or Canvas Insulation-Covering Substrates: Including pipe and duct coverings.
 - 1. Institutional Low-Odor/VOC Latex System:

- a. Prime Coat: Interior latex primer/sealer.
 - 1) SUPER SPEC Latex Enamel Undercoater & Primer Sealer 253; Benjamin Moore & Co.
 - 2) Interior Latex Primer DU0004125; Duron, Inc.
 - 3) Gripper Interior/Exterior Primer-Sealer 3210-1200; Glidden Professional.
 - 4) SPEEDHIDE 6-2 Interior Latex Sealer Quick-Drying; PPG Industries.
 - 5) ProMar 200 Zero VOC Interior Latex Primer B28W2600; Sherwin-Williams Company.
- b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Eggshell Finish (N538); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Latex Eggshel DU0036102l; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) ProMar 200 Zero VOC Eg-Shel, B20-2600; Sherwin-Williams Company.
- c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).
 - 1) Ultra Spec 500 Interior Eggshell Finish (N538); Benjamin Moore & Co.
 - 2) Lifemaster Interior Latex Eggshell 9300; Duron, Inc.
 - 3) ; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) ProMar 200 Zero VOC Eg-Shel, B20-2600; Sherwin-Williams Company.

M. Exposed PVC Piping:

- 1. Institutional Low-Odor/VOC Latex System over bond coat:
 - a. Bond Coat:
 - 1) STIX Waterborne Bonding Primer SXA-110; Insl-X (Benjamin Moore & Co.)
 - 2) Terminator 2 Water Based Stain Killer/Primer, DU0071218; Duron, Inc.
 - 3) Gripper Interior/Exterior Primer-Sealer 3210-1200; Glidden Professional.
 - 4) SEAL Grip 17-921 Interior/Exterior 100% Acrylic Universal Primer/Sealer; PPG Industries.
 - 5) Adhesion Bonding Primer, B51W50; Sherwin-Williams Company.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - 1) Ultra Spec 500 Interior Eggshell Finish (N538); Benjamin Moore & Co.
 - 2) Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) ProMar 200 Zero VOC Eg-Shel, B20-2600 Series; Sherwin-Williams Company.
 - c. Topcoat: Interior latex (eggshell).
 - 1) Ultra Spec 500 Interior Eggshell Finish (N538); Benjamin Moore & Co.
 - Ultra Deluxe Interior Acrylic Latex Eggshell Enamel, DU0036 Series; Duron, Inc.
 - 3) Lifemaster Interior Latex Eggshell 9300; Glidden Professional.
 - 4) SPEEDHIDE 6-421 series High Solids Interior Enamel Eggshell Latex; PPG Industries.
 - 5) ProMar 200 Zero VOC Eg-Shel, B20-2600 Series; Sherwin-Williams Company.

- N. Hardboard Floor Surface Stage Surfacing:
 - 1. Institutional Low-Odor/VOC low sheen floor finish:
 - a. First Coat:
 - 1) Devflex 4212; Glidden Professional.
 - 2) Armorseal Tread-Plex B90 Series; Duron, Inc.
 - 3) Armorseal Tread-Plex B90 Series or H&C Solid Color Acrylic Deck Coating (Black); Sherwin-Williams Company.
 - b. Top Coat:
 - 1) Devflex 4212; Glidden Professional.
 - 2) Armorseal Tread-Plex B90 Series; Duron, Inc.
 - 3) Armorseal Tread-Plex B90 Series or H&C Solid Color Acrylic Deck Coating (Black); Sherwin-Williams Company.

3.7 INTERIOR PAINTING SCHEDULE - EXISTING AREAS

- A. Wherever alterations and changes occur as a result of Work under the Contract in any room of existing building, except as specifically indicated on Drawings, paint affected ceiling and wall areas as specified under the Standard Painting Applications listed in this Section; the wall or ceiling in which the alterations occur will be painted from natural break to natural break.
- B. Generally, paint color in altered areas will match the adjoining surfaces as closely as possible.
- C. All doors and frames within "Limits of Contract" will be painted on both sides as required by the applicable Master Specifications; new Work, all required coats.
- D. When painting existing surfaces, Contractor bears the responsibility of assuring compatibility of new paint materials with existing.

END OF SECTION

SECTION 09 93 00 - STAINING AND TRANSPARENT FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes surface preparation and the application of wood finishes on the following substrates:
 - 1. Interior Substrates:
 - a. Dressed lumber (finish carpentry).
 - b. Exposed wood panel products.
 - 2. Exterior Substrates:
 - a. Dressed lumber (finish carpentry).
 - b. Exposed wood panel products.
 - c. Wood decks and stairs.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures, project meetings, progress schedules and documentation, reports, coordination.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: For each type of product indicated.
- C. Samples for Initial Selection: For each type of product indicated
- D. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.
 - 1. Submit Samples on representative samples of actual wood substrates, 8 inches square.
 - 2. Label each Sample for location and application area.
- E. Product List: For each product indicated, include the following:
 - 1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- F. LEED Submittals: For Credit EQ 4.2, manufacturers' product data for field-applied finishes, including printed statement of VOC content in g/L.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - a. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Benjamin Moore & Co.
- B. Duron, Inc.
- C. Glidden Professional/Flood Company.
- D. PPG Industries.
- E. Sherwin-Williams Company.

2.2 MATERIALS, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
- B. Stain Colors: Match Architect's samples.
- C. LEED Compliance: Field-applied wood finishes applied to interior elements can not exceed the VOC content limits established in South Coast Air Quality Management District Rule 1113, Architectural Coatings, rules in effect January 1, 2004.
 - 1. Clear Wood Finishes VOC Limits:
 - a. Varnish 350 g/L.
 - b. Lacquer 550 g/L.
 - 2. Sealers VOC Limits:
 - a. Sanding Sealers: 275 g/L.
 - b. Other Sealers: 200 g/L.
 - 3. Stains VOC Limits: 250 g/L.
 - 4. Shellacs VOC Limits: Clear 730 g/L; pigmented 550 g/L.
- D. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.

2.3 WOOD FILLERS

A. Wood Filler Paste: As recommended by finish manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
 - 1. Maximum Moisture Content of Wood Substrates: 15 percent when measured with an electronic moisture meter.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.
 - 3. Begin finish application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 4. Beginning application of finish system constitutes Contractor's acceptance of substrate and conditions.

3.2 PREPARATION

- A. Remove plates, machined surfaces, and similar items already in place that are not to be finished. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 - 1. After completing finishing operations, reinstall items that were removed; use workers skilled in the trades involved. Remove surface-applied protection if any.
- B. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 - 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
 - 3. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.
- C. Apply wood filler paste to open-grain woods, to produce smooth, glasslike finish.

3.3 APPLICATION

- A. Apply in accordance with manufacturer's instructions.
 - 1. Use applicators and techniques suited for finish and substrate indicated.
 - 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING

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

3.5 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

- A. Finish Carpentry Substrates:
 - 1. Polyurethane Varnish Over Stain System:
 - a. Stain Coat: Interior wood stain (semitransparent).
 - Minwax 250 V.O.C. Compliant WoodFinish Interior Penetrating Stain; Duron, Inc.
 - OLYMPIC 44500 Preminum Interior Oil Based Wood Stain 240 gpl VOC; PPG Industries.
 - 3) Minwax 250 V.O.C. Compliant WoodFinish Interior Penetrating Stain; Sherwin-Williams Company.

- 4) Wood Pride Professional Finish Water Based Semi-Transparent Wood Finishing Stain 1700V Series; Glidden Professional.
- b. Two Finish Coats: Interior, waterborne polyurethane (satin).
 - 1) Benwood Stays Clear Acrylic Polyurethane Low Lustre 423; Benjamin Moore & Co.
 - 2) Wood Classic WB Polyurethane, A68 Series; Duron, Inc.
 - 3) OLYMPIC Preminum Interior Water Based Polyurethane Clear 42786 Stain / 42784 Gloss; PPG Industries.
 - 4) WoodClassics Waterborne Polyurethane Varnish Gloss A68V91 (first coat)/Satin A68F90 (second coat); Sherwin-Williams Company.
 - 5) Wood Pride Professional Finishes Water Based Satin Varnish 1802-0000; Glidden Professional.

B. Exposed Wood Panel-Product Substrates:

- 1. Polyurethane Varnish Over Stain System:
 - a. Stain Coat: Interior wood stain (semitransparent).
 - Minwax 250 V.O.C. Compliant WoodFinish Interior Penetrating Stain; Duron, Inc.
 - OLYMPIC 44500 Preminum Interior Oil Based Wood Stain 240 gpl VOC; PPG Industries.
 - 3) Minwax 250 V.O.C. Compliant WoodFinish Interior Penetrating Stain; Sherwin-Williams Company.
 - 4) Wood Pride Professional Finish Water Based Semi-Transparent Wood Finishing Stain 1700V Series; Glidden Professional.
 - b. Two Finish Coats: Interior, waterborne polyurethane (satin).
 - 1) Benwood Stays Clear Acrylic Polyurethane Low Lustre 423; Benjamin Moore & Co
 - 2) Wood Classic WB Polyurethane, A68 Series; Duron, Inc.
 - 3) OLYMPIC Preminum Interior Water Based Polyurethane Clear 42786 Stain / 42784 Gloss; PPG Industries.
 - 4) WoodClassics Waterborne Polyurethane Varnish Gloss A68V91 (first coat)/Satin A68F90 (second coat); Sherwin-Williams Company.
 - 5) Wood Pride Professional Finishes Water Based Satin Varnish 1802-0000; Glidden Professional.

3.6 EXTERIOR WOOD-FINISH-SYSTEM SCHEDULE (OTC Compliant)

- A. Finish Carpentry Substrates:
 - 1. Solid-Color, Solvent-Based Stain System:
 - a. Prime Coat: Exterior [alkyd] [oil] wood primer.
 - Benwood Stays Clear Acrylic Polyurethane Low Lustre 423; Benjamin Moore & Co.
 - 2) WoodScapes Solid Color Stain, A15 Series; Duron, Inc.
 - 3) Stain Stomper Exterior Primer Sealer 2110N Series (OTC Compliant); Glidden Professional.
 - 4) SUN-PROOF Deck, Fence, Siding Solid Color / Oil Stain; PPG Industries.
 - 5) WoodScapes Solid Color Stain, A15 Series; Sherwin-Williams Company (The).
 - b. Two Stain Coats: Exterior solid-color stain (water-based).
 - 1) ; Duron, Inc.

- 2) Wood Pride Professional Finishes Exterior Waterborne Soild Color Stain 2600 Series; Glidden Professional.
- 3) SUN-PROOF Deck, Fence, Siding Solid Color / Oil Stain; PPG Industries.
- 4) ; Sherwin-Williams Company (The).
- 2. Semitransparent Stain System:
 - a. Two Stain Coats: Exterior semitransparent stain (solvent based).
 - 1) Arborcoat Waterborne Exterior Semi Transparent Deck & Siding Stain, 638; Benjamin Moore & Co.
 - DeckScapes OTC Compliant Alkyd/Oil Semi-Transparent Stain, A15 Series; Duron, Inc.
 - 3) Flood TWF-SEMI Semi-Transparent Wood Finish; Glidden Professional.
 - 4) SUN-PROOF 77-1560 Deck, Fence, Siding Semi Opaque Oil / Acrylic Stain; PPG Industries.
 - 5) DeckScapes OTC Compliant Alkyd/Oil Semi-Transparent Stain, A15 Series; Sherwin-Williams Company (The).
- 3. Clear, Two-Component Polyurethane System:
 - a. Three Finish Coats: Two-component aliphatic polyurethane (clear).
 - 1) Arborcoat Waterborne Exterior Stain Protective Clear Coat, 636; Benjamin Moore & Co. (RECOMMENDED: ONE COAT ONLY)
 - 2) _____; Duron, Inc.
 - 3) _____; ICI Paints.
 - 4) ; McCormick Paints.
 - 5) SUN-PROOF 77-1460 Deck, Fence, & Siding Stain Acrylic/Oil Semi-Transparent Stain-Clear base; PPG Industies.
 - 6) _____; Sherwin-Williams Company (The).
- B. Exposed Wood Panel-Product Substrates:
 - 1. Solid-Color, Solvent-Based Stain System:
 - a. Prime Coat: Exterior [alkyd] [oil] wood primer.
 - 1) If Tannin Bleeding occurs, use Maxwood_Exterior; Wood Primer Stain Block Formula DU000823; Duron, Inc.
 - 2) Stain Stomper Exterior Paints Sealer 2110N Series (OTC Compliant); Glidden Professional.
 - 3) SUN-PROOF 77-1110 series Deck, Fence, Siding Solid Color / Acrylic Stain; PPG Industries.
 - 4) If Tannin Bleeding occurs, use A-100 Exterior Stain Blocking Primer, Y24 Series; Sherwin-Williams Company (The).
 - 5) If Tannin, use Alkyd Stain Primer, 366 or Fresh Start All Purpose 100 Percent Acrylic Primer 023; Benjamin Moore & Co.
 - b. Two Stain Coats: Exterior solid-color stain (water-based).
 - Arborcoat Waterborne Solid Color Deck & Siding Stain, 640; Benjamin Moore & Co.
 - 2) WoodScapes Solid Color Stain, A15 Series; Duron, Inc.
 - 3) Wood Pride Professional Finishes Exterior Waterborne Solid Color Stain 2600 Series; Glidden Professional.
 - 4) SUN-PROOF Deck, Fence, Siding Solid Color / Oil Stain; PPG Industries.
 - 5) WoodScapes Solid Color Stain, A15 Series; Sherwin-Williams Company (The).
 - 2. Semitransparent Stain System:
 - a. Two Stain Coats: Exterior semitransparent stain (solvent based).

- 1) Arborcoat Waterborne Exterior Semi Transparent Deck & Siding Stain, 638; Finish with one coat Arborcoat Waterborne Exterior Stain Protective Clear Coat, 636; Benjamin Moore & Co. (RECOMMENDED: ONE COAT ONLY)
- DeckScapes OTC Compliant Alkyd/Oil Semi-Transparent Stain, A15 Series;
 Duron, Inc.
- 3) Flood TWF-SEMI Semi-Transparent Wood Finish; Glidden Professional.
- 4) SUN-PROOF 77-1560 Deck, Fence, Siding Semi Opaque Oil / Acrylic Stain; PPG Industries.
- 5) DeckScapes OTC Compliant Alkyd/Oil Semi-Transparent Stain, A15 Series; Sherwin-Williams Company (The).

C. Wood Deck and Stair Substrates:

- 1. Preservative Coat: Wood preservative.
- 2. Two Stain Coats: Stain for wood decks.
 - a. Arborcoat Waterborne Exterior Semi Transparent Deck & Siding Stain, 638; Finish with one coat Arborcoat Waterborne Exterior Stain Protective Clear Coat, 636; Benjamin Moore & Co. (RECOMMENDED: ONE COAT ONLY)
 - b. DeckScapes Acrylic Semi-Transparent Deck Stain, A15T15 Series; Duron, Inc.
 - c. Flood TWF-SEMI Semi-Transparent Wood Finish; Glidden Professional.
 - d. SUN-PROOF 77-1560 Deck, Fence, Siding Semi Opaque Oil / Acrylic Stain; PPG Industries.
 - e. DeckScapes Acrylic Semi-Transparent Deck Stain, A15T15 Series; Sherwin-Williams Company (The).

END OF SECTION

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This Section includes surface preparation and application of high-performance coating systems on the following substrates:
 - 1. Interior Substrates:
 - a. Concrete masonry units (CMU).
 - b. Gypsum board.
 - 2. Exterior Substrates:
 - a. Exposed steel canopy structure and other rooftop structures.
 - b. Exposed angle lintels and hung plates.

1.2 DEFINITIONS

A. Gloss Ranges:

- 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
- 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
- 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
- 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: For each type of product indicated.
- C. Samples for Initial Selection: For each type of finish-coat product indicated.
- D. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
 - 1. Submit Samples on rigid backing, minimum 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- E. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- F. LEED Submittals: For Credit EQ 4.2, manufacturers' product data for interior coatings, including printed statement VOC content and chemical components; requirements of coating systems for high humidity areas differ from normal-conditioned spaces.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - a. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.5 MOCK-UP

- A. Benchmark Samples (Mock-ups): Provide benchmark finish sample (all coats) for each coating type and substrate.
 - 1. Architect will select several rooms or surfaces to represent surfaces and conditions, for application of each paint system type and substrate; colors will be provided for Benchmark Samples.
 - a. Wall Surfaces: Complete minimum 100 square feet.
 - b. Small Areas and Items: Apply systems to items designated by the Architect.
 - 2. Complete Benchmark Samples per the requirements of this Section.
 - a. Provide required sheen, color and texture for each surface.
 - b. Architect-accepted Benchmark Samples to establish level of quality for remainder of Work.
 - 3. Architect to provide final color approvals from Benchmark Samples and intermediate coat wall colors; refer to subsection 3.3 of this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Benjamin Moore & Co.
- B. Duron, Inc.
- C. Glidden Professional.
- D. International Paint LLC distributed by McCormick Paints.
- E. PPG Industries.
- F. Sherwin-Williams Company.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

- 2. Provide products of same manufacturer for each coat in a coating system.
- B. Chemical Components of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions:
 - 1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 - 2. Nonflat Paints and Coatings: VOC content of not more than 150 g/L.
 - 3. Anticorrosive & Anti-Rust Coatings: VOC content of not more than 250 g/L.
 - 4. Aromatic Compounds: Paints and coatings of not more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing 1 or more benzene rings).
 - 5. Restricted Components: Paints and coatings not to contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Aqueous ammonia.
 - e. Benzene.
 - f. Butyl benzyl phthalate.
 - g. Cadmium.
 - h. Crystalline silica.
 - i. Di (2-ethylhexyl) phthalate.
 - j. Di-n-butyl phthalate.
 - k. Di-n-octyl phthalate.
 - l. 1,2-dichlorobenzene.
 - m. Diethyl phthalate.
 - n. Dimethyl phthalate.
 - o. Ethylbenzene.
 - p. Ethylene glycol.
 - q. Formaldehyde.
 - r. Hexavalent chromium.
 - s. Isophorone.
 - t. Lead.
 - u. Mercury.
 - v. Methyl ethyl ketone.
 - w. Methyl isobutyl ketone.
 - x. Methylene chloride.
 - y. Naphthalene.
 - z. Toluene (methylbenzene).
 - aa. 1,1,1-trichloroethane.
 - ab. Vinyl chloride.
- C. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.
- D. Colors: As selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
 - 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

- a. Masonry (CMU): 12 percent.
- b. Gypsum Board: 12 percent.
- c. Concrete: 12 percent.
- 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- 3. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
- 4. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
- D. CMU Substrates: Remove 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.
- E. Steel Substrates: Remove rust and loose mill scale.
 - 1. Clean using methods recommended in writing by coating manufacturer.
 - 2. Blast clean according to SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

3.3 COLOR COORDINATION

- A. Tint intermediate coats for wall surfaces to match color sample selections.
- B. Architect will visit the Project within 7 days after notification, to review primed walls for final color coordination.
- C. Allow 3 week days in schedule for Architect to change final wall colors between intermediate coat and remaining coat(s).
- D. Allow time to order final paint colors; do not order final paint colors until obtaining final color approvals.

3.4 APPLICATION

- A. Apply in accordance with manufacturer's instructions.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

- 2. Wall Surfaces: Receive final color approvals following Architect's review of Intermediate Coats, before proceeding.
- 3. Omit primer over metal surfaces that have been shop primed and touchup painted.
- 4. If undercoats or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
- 5. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Apply high-performance coatings according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for coating and substrate indicated.
 - 2. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
 - a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 - 3. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 4. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- D. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- E. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
 - 1. Wall Surfaces: Tint Prime Coat a lighter shade to facilitate identification; tint Prime Coat to match color of finish coat, but provide sufficient difference in shade to distinguish Prime Coat from Intermediate Coat used for final color selections.
 - 2. Other Surfaces: Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- F. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- G. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

- H. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.
- I. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

3.5 CLEANING

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

3.6 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Gypsum Board Substrates:
 - 1. Water-Based Epoxy Coating System:
 - a. Prime Coat: Interior latex primer/sealer.
 - 1) Fresh Start All Purpose 100% Acrylic Primer 023; Benjamin Moore & Co.
 - 2) Acrylic Latex Drywall Primer Sealer DU004124; Duron, Inc.
 - 3) Glidden Professional 1000 High-Hide Interior Primer, Glidden Professional.
 - 4) Sealzit II Primer-Sealer-Stain Blocker 06443; McCormick Paints.
 - 5) SPEEDHIDE 6-2 Interior Latex Sealer Quick-Drying; PPG Industries.
 - 6) ProGreen 200 Interior Latex Primer, B28W600 Series; Sherwin-Williams Company.
 - b. Intermediate Coat: Water-based epoxy.
 - 1) Super Spec HP Acrylic Epoxy Coating P43; Benjamin Moore & Co.
 - 2) Pro Industrial Water Based Catalyzed Epoxy Enamel B70W211; Duron, Inc.
 - 3) TRU-GLAZE-WB™ 4426 Waterborne Epoxy Semi-Gloss Coating; Glidden Professional.
 - 4) InterH2O 735; International Paint LLC; distributed through McCormick Paints.
 - 5) Pitt Glaze WB 16-551 series Water Based Epoxy; PPG Industries.
 - 6) Water Based Catalyzed Epoxy Enamel B70; Sherwin-Williams Company.
 - c. Topcoat: Water-based epoxy.
 - 1) Super Spec HP Acrylic Epoxy Coating P43; Benjamin Moore & Co.
 - 2) Pro Industrial Water Based Catalyzed Epoxy Enamel B70W211; Duron, Inc.
 - 3) TRU-GLAZE-WB™ 4426 Waterborne Epoxy Semi-Gloss Coating; Glidden Professional.
 - 4) InterH2O 735; International Paint LLC; distributed through McCormick Paints.
 - 5) Pitt Glaze WB 16-551 series Water Based Epoxy; PPG Industries.
 - 6) Water Based Catalyzed Epoxy Enamel B70; Sherwin-Williams Company.

B. CMU Substrates:

- 1. Epoxy Coating System:
 - a. Prime Coat: Epoxy block filler.

- 1) Super Spec Waterborne Latex Block Filler 160; Benjamin Moore & Co.
- 2) Dura Clad 700 Cementitious Block Filler (high moisture areas), or DuraCrete High Performance Acrylic Block Filler, DU0016110; Duron, Inc.
- 3) TRU-GLAZE-WB™ 4015 High Performance Waterborne Epoxy Block Filler; Glidden Professional.
- 4) Pitt Glaze WB 16-90 Epoxy Block Filler; PPG Industries.
- 5) Kem Cati-Coat HS Epoxy Filler/Sealer, B24W400/V400 S (high moisture areas), or S-W Loxon Block Surfacer, A24W200; Sherwin-Williams Company.
- b. Intermediate Coat:
 - Super Spec HP Acrylic Epoxy Semi-Gloss Catalyzed P43; Benjamin Moore & Co.
 - 2) Water Based Catalyzed Epoxy Enamel B70; Duron, Inc.
 - 3) TRU-GLAZE-WB™ 4426 Waterborne Epoxy Semi-Gloss Coating; Glidden Professional.
 - 4) Pitt Glaze WB 16-551 series Water Based Epoxy; PPG Industries.
 - 5) Water Based Catalyzed Epoxy Enamel B70; Sherwin-Williams Company.
- c. Topcoat: Epoxy, cold-cured, gloss.
 - Super Spec HP Acrylic Epoxy Semi-Gloss Catalyzed P43; Benjamin Moore & Co.
 - 2) Water Based Catalyzed Epoxy Enamel B70; Duron, Inc..
 - 3) TRU-GLAZE-WB™ 4426 Waterborne Epoxy Semi-Gloss Coating; Glidden Professional.
 - 4) Pitt Glaze WB 16-551 series Water Based Epoxy; PPG Industries.
 - 5) Water Based Catalyzed Epoxy Enamel B70; Sherwin-Williams Company.

3.7 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Exposed Structural Canopy Steel, Angle Lintels and Hung Plate Substrates:
 - 1. Basis-of-Design Polysiloxane Coating System:
 - a. Prime Coat: Two component, high solids, metallic rich epoxy primer.
 - b. Intermediate Coat: High-build epoxy marine coating, low gloss.
 - c. Topcoat: Two component, high solids Polysiloxane coating Interfine 878 by International Paint LLC.
 - 2. Polysiloxane System PPG Industries:
 - a. Prime Coat: PPG AQUAPON 97-670 series Organic Zinc Rich Primer.
 - b. Prime Coat: PPG Pittguard 97-946 series All-Weather DTR Epoxy Mastic.
 - c. Topcoat: PPG Amercoat PSX 1001 Series Single pack acrylic polysiloxane.
 - 3. Other Available Products:
 - a. Glidden Professional (Devoe Coatings) Steel:
 - 1) Prime Coat: CATHA-COAT® 302H Reinforced Inorganic Zinc Primer.
 - 2) Intermediate Coat: BAR-RUST® 231 Multi-Purpose Epoxy.
 - 3) Topcoat: DEVTHANE® 379UVA Aliphatic Acrylic Urethane Gloss Enamel.
 - b. Glidden Professional (Dovoe Coatings) Galvanized Steel:
 - 1) Prime Coat: DEVRAN® 205 Universal Epoxy.
 - 2) Intermediate Coat: DEVTHANE® 379UVA Aliphatic Acrylic Urethane Gloss Enamel.
 - 3) Topcoat: DEVTHANE® 379UVA Aliphatic Acrylic Urethane Gloss Enamel.
 - c. Sherwin-Williams Company Steel:
 - 1) Prime Coat: S-W Zinc Clad IV Epoxy Primer B69 A8 Series.

- 2) Intermediate Coat: S-W Acrolon 218HS B65W00611 Aliphatic Urethane Gloss Enamel.
- 3) Topcoat: S-W Acrolon 218HS B65W00611 Aliphatic Urethane Gloss Enamel.
- d. Sherwin-Williams Company Galvanized Steel:
 - 1) Prime Coat: S-W Recoatable Epoxy Primer B67A5 Series or, for high abrasion areas: DTM Wash Primer.
 - 2) Intermediate Coat: S-W Acrolon 218HS B65W00611 Aliphatic Urethane Gloss Enamel
 - 3) Topcoat: S-W Acrolon 218HS B65W00611 Aliphatic Urethane Gloss Enamel.
- e. PPG Industries, Inc.:
 - 1) Prime Coat: PPG Pittguard 97-946 series All-Weather DTR Epoxy Mastic.
 - 2) Intermediate Coat: PPG Pitthane Ultra 95-812 series Acrylic Aliphatic Urethane.
 - 3) Topcoat: PPG Pitthane Ultra 95-812 series Acrylic Aliphatic Urethane.
- f. PPG Industries, Inc.:
 - 1) Prime Coat: PPG AQUAPON 97-670 series Organic Zinc Rich Primer.
 - 2) Intermediate Coat: PPG Pitthane Ultra 95-812 series Acrylic Aliphatic Urethane.
 - 3) Topcoat: PPG Pitthane Ultra 95-812 series Acrylic Aliphatic Urethane.
- B. Do not allow excessive time to elapse following application of epoxy type coatings, as determined by the manufacturer; document manufacturer's recommendation for the Architect's information.

SECTION 09 96 23 - GRAFFITI RESISTANT COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Clear-drying, weatherproofing and graffiti resistant coating for masonry materials.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate special procedures.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Maintenance Data: Include cleaning procedures and graffiti removal procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.

1.5 MOCK-UP

- A. Provide mock-up of coating, 4 feet long by 4 feet wide, illustrating specified coating.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.6 FIELD CONDITIONS

- A. Do not install materials when temperature is below 40 degrees F or above 95 degrees F.
- B. Maintain this temperature range, during and 8 hours after installation of coating.

1.7 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: GSS Coatings/American Polymer; Graffiti Solution System.
- B. Subject to specified requirements, other acceptable manufacturers:
 - 1. Chemical Products Industries, Inc.
 - 2. Textured Coatings of America, Inc.: www.texcote.com.
 - 3. Prosoco.

2.2 MASONRY COATINGS

- A. Clear-drying, water-based acrylic eurethane base coat and solvent-based eurethane resin top coat for weatherproofing concrete block and other porous masonry materials and protecting them from graffiti attacks without altering the natural appearance.
- B Technical Data:

- 1. Form: Milky white liquid
- 2. Specific Gravity: 1.00
- 3. Pounds/Gallon: 8.32 pounds
- 4. Active Content: 6%
- 5. Total Solids: 6% ASTM D 50956. Flash Point: >212 degrees F
- 7. Freeze Point: 32 degrees F
- 8. VOC Content: <20 g/L, Low Solids Coating.

2.3 MATERIALS

- A. Coatings General: Provide complete systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses required.
 - 1. Maximum volatile organic compound (VOC) content: As required by applicable regulations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates
- C. Cementitious Substrates: Do not begin application until substrate has cured 28 days minimum.

3.2 PREPARATION

- A. Clean surfaces of loose foreign matter.
- B. Surfaces to be dry and absorbent.
- C. Remove finish hardware, fixture covers, and accessories and store.
- D. Caulking and sealants are to be in place and cured prior to application.
- E. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.3 COATING APPLICATION

- A. Apply two coatings in accordance with manufacturer's instructions.
- B. Apply with bruch, roller or low-pressure spray.
 - 1. Spray:
 - a. Using low-pressure (<50 psi) spray equipment, saturate, "wet-on-wet" spraying from the bottom up. Avoid excessive overlapping.
 - b. For textured and porous surfaces, apply enough material to create 6 to 8 inch rundown below the contact point.
 - c. For dense, smooth surfaces, apply enough in a single saturating application.
 - d. Back roll all runs and drips for a uniform appearance. Over application may cause unacceptable color change. Always test.
 - e. Let first application penetrate masonry surface for 2 to 3 minutes.
 - f. For textured and porous surfaces, reapply in same saturating manner to ensure complete coverage of recessed surfaces.
 - g. Immediately brush out runs and drips to prevent build up.

2. Brush or Roller:

a. Saturate uniformly. Let product penetrate for 2-3 minutes. Re-saturate. Brush out heavy runs and drips that don't penetrate.

3. Second Coat:

a. Apply the second wet-on-wet coat as soon as the first application is dry to the touch or within one hour. Allowing more than one hour between coats could reduce the effectiveness of the second coat or cause darkening.

3.4 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.5 PROTECTION

A. Protect surfaces from rainfall for 6 hours following treatment.

SECTION 10 00 05 - MISCELLANEOUS SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes equipment and specialties not specified in other sections of the Project Manual
- B. Furnish labor, materials, tools, equipment, services and supervision required to complete Work, including all incidental and complementary Work shown, specified or necessary to complete Work.
- C. Make all final connections for products included in this Section.
- D. Section includes:
 - 1. Rain Harvesting System.
 - 2. Corner guards.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate locations, construction and anchorage details, dimensions and rough-in opening sizes.
- B. Product Data: Submit data for furnishings describing size, color and finish, details of function and attachment methods.
- C. LEED Submittals: Provide documentation for composite wood and laminating adhesives products indicating no added urea formaldehyde.

D. Samples:

- 1. When directed by the Architect, furnish samples showing full color range and other features of the product.
- 2. Where applicable, furnish one of each type wall clip or anchoring device to install product to the building construction.
- E. Certify in writing that each product meets the specifications and can be installed in building where scheduled; certifications shall be produced and submitted following verification of site conditions.
- F. Submit operation and maintenance data for electrically operated equipment.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.4 PROJECT CONDITIONS

- A. Verify measurements in field as required for Work fabricated to fit job conditions.
- B. Before ordering items or fabrication of Work, examine Drawings, job conditions, to assure good fit, neat installation.

PART 2 PRODUCTS

2.1 RAIN HARVESTING SYSTEM (Alternate)

- A. Basis of Design: Slimline by Bushman: www.bushmanusa.com/130-gallon-slimline-rain-tank
 - 1. Color: Clay/Copper (polypropylene)
 - 2. Capacity: 265 Gal

- 3. Dimensions: 4'-11"W x 2'-1"D x 5'-4"H.
- 4. Product No: BSLT265e
- 5. Warranty: 5 year
- 6. Overflow: 3" min. outer diameter
- 7. Description: UV stabilized to reduce algae growth
- 8. Spigot with hose connection
- 9. Accessories:
 - a. "Y" Diverter Kit with pre-fitted sections of pipe with diverter lever connection at base bid downspout
 - b. Leaf catcher filter
 - c. Overflow connection to base bid downspout
 - d. Fitting escutcheon for direct connection between downspout and tank
 - e. RainHarvesting's Tank Gauge/Water Level indicator (www.rainharvest.com)
 - f. Surface mount sign printed in color on a white background in English and Spanish by RainHarvest Systems SKU ACB-4980; (Caution (ANSI) Non-potable Water. Do not drink)

2.2 CORNER GUARDS

A. Manufacturers:

- 1. Nystrom Building Products; Product CGSS-304: www.nystrom.com.
- 2. Construction Specialties, Inc; Product C0-8: www.c-sgroup.com.
- 3. InPro Corporation; Product Stainless Steel Corner Guards: www.inprocorp.com.
- B. Location: All outside gypsum board corners.
- C. Corner Guard Surface Mounted: Formed one-piece unit, installed with tape.
 - 1. Material: 16 gage Type 304 stainless steel.
 - 2. Size: 3-1/2 inches.
 - 3. Length: 48 inches high.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Order items in ample time so as not to delay job progress with delivery at job site coordinated with other Work.
- B. Install in a thorough, workmanlike manner, in strict accordance with manufacturer's printed instructions and subject to inspection by the Architect.

C. Assembly:

- 1. Deliver factory-built units completely assembled in one piece without joints, whenever possible.
- 2. Where dimensions exceed unit size, provide two or more pieces of equal length as acceptable to Architect and Owner.
- 3. When overall dimensions require delivery in separate units, prefit at factory, disassemble for delivery, and make final joints at site.
- 4. Use splines at joints to maintain surface alignment.
- D. Install units in locations and mounting heights as shown on Drawings, keeping perimeter lines straight, plumb and level.
- E. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.

- F. Coordinate job-assembled units with grounds, trim and accessories; join all parts with neat, precision fit.
- G. Verify accessories required for each unit properly installed and operating units properly functioning.

3.2 CLEANUP

A. Remove temporary protective cover at completion.

SECTION 10 11 01 - VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Markerboards and Tackboards.
- B. Dry-erase wall covering.

1.2 REFERENCE STANDARDS

- A. ANSI A208.1 American National Standard for Particleboard; 2009.
- B. ASTM A424/A424M Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a.
- C. ASTM C208 Standard Specification for Cellulosic Fiber Insulating Board; 2012.
- D. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements 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, special anchor details.
 - 1. Include dimensions indicating location of boards in relation to other items in the room.
- D. Samples: Submit color charts for selection of color and texture of markerboard, tackboard, tackboard surface covering, and trim.
- E. Test Reports: Show conformance to specified surface burning characteristics requirements.
- F. LEED Submittals: Product data indicating composite wood, agrifiber products and laminating adhesives have no added urea formaldehyde.
- G. Maintenance Data: Include data on regular cleaning, stain removal.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.5 WARRANTY

- A. See Section 01 78 00 Closeout Submittals 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.
- C. Provide ten year warranty for tackboards to include repair or replacement of tackboards that fail in materials or workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Dry Erase Wallcovering:
 - 1. Basis-of-Design: Walltalkers ez-rite.

- B. Visual Display Boards:
 - 1. MooreCo, Inc: www.moorecoinc.com.
 - 2. Claridge Products and Equipment, Inc; LCS Markerboard Series 1 (Basis-of-Design): www.claridgeproducts.com.
 - 3. Marsh Industries, Inc.: www.marsh-ind.com.

2.2 VISUAL DISPLAY BOARDS

- A. Adhesive Backed Dry Erase Wallcovering:
 - 1. Material: High gloss, vinyl surface for dry erase markers.
 - 2. Accessories:
 - a. Adhesives: Heavy-duty clear or clay based premixed vinyl adhesive.
 - b. Substrate Primer/Sealer: White pigmented acrylic base primer/sealer specifically formulated for use with vinyl wallcoverings.
- B. Markerboards: Porcelain enamel on steel, laminated to core, capable of holding magnets.
 - 1. Steel Face Sheet Thickness: 24 gage, 0.0239 inch.
 - 2. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
 - 3. Backing: Aluminum sheet, laminated to core.
 - 4. Frame: Extruded aluminum, with concealed fasteners.
 - 5. Frame Profile: As indicated on drawings
 - 6. Frame Finish: Anodized, natural.
 - 7. Accessories: Provide chalk tray and map rail.
 - a. Provide continuous chalk tray; match length of markerboard.
 - b. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
- C. Tackboards: Composition cork.
 - 1. Vinyl Plastic Cork:
 - a. Natural materials consisting of linseed oil, granulated cork, resin binders and dry pigments, mixed and calendered onto a natural jute backing.
 - b. Color shall extend throughout total thickness of material.
 - c. Able to self-heal from thumbtack and pin punctures.
 - d. Does not dry, crack, peel or crumble.
 - e. Washable finish.
 - 2. Cork Thickness: 1/8 inch.
 - 3. Color: Minimum of nine color selections available for Architect selection; Architect reserves the right to select several colors throughout the Project.
 - 4. Backing: Fiberboard, 3/8 inch thick, laminated to tack surface.
 - 5. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 - 6. Size: As indicated on drawings.
 - 7. Frame: Same type and finish as for markerboard.
 - a. Exception: Tackboards mounted on doors to be provided with solid wood frame coordinated with species of door.
 - 8. Frame Finish: Anodized, natural.
- D. Combination Units and Units Made of More Than One Panel: Factory-assembled markerboards and tackboards in a single frame, of materials specified above.
 - 1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.

- 2. Join panels of similar construction with butt joints, aligned and secured with steel spline concealed in edge of core.
- 3. Configuration: As indicated on drawings.
- 4. Units Too Large to Ship Assembled: Fully assembled in factory, then disassembled for shipping.

2.3 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.
 - 1. Core for markerboards.
- C. Fiber Board: ASTM C208, cellulosic fiber board.
 - 1. Core for tackboards.
- D. Aluminum Sheet Backing: Manufacturers standard thickness.
- E. Adhesives: Type used by manufacturer.

2.4 ACCESSORIES

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.
- B. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.
 - 1. Provide two map hooks for every 48 inches of map rail or fraction thereof.
- C. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board.
 - 1. Provide one standard flag holder at the front of each classroom.
- D. Chalk Tray: Aluminum, manufacturer's standard profile one piece full length of chalkboard, molded ends; concealed fasteners, same finish as frame.
- E. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.2 INSTALLATION (MARKERBOAR AND TACKBOARD)

- A. Install boards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.
- C. Butt Joints: Install with tight hairline joints.

3.3 INSTALLATION (WALLCOVERING)

- A. Wallcovering Backing:
 - 1. Acclimate wallcovering in the area of installation a minimum of 24 hours before installation.
 - 2. Read and follow the manufacturer's installation instruction sheet contained in each roll of the dry erase wallcovering.

- 3. Examine all materials for pattern, color, quantity and quality, as specified for the correct location prior to cutting.
- 4. Primer: Use a quality pigmented acrylic wallcovering primer.
- 5. Adhesive: Apply a uniform coat of heavy-duty pre-mixed clay-based or extra strength clear wallcovering adhesive.
- 6. Install each strip horizontally and in the same sequence as cut from the roll.
- 7. Install dry erase wallcovering sheets in exact order as they are cut from bolt. Reverse hang alternate strips (except lined products). Do not crease or bend the wallcovering when handling.
- 8. Install dry erase wallcovering horizontally using a level line.
- 9. Using a level or straight edge, double cut the seam with a seam-cutting tool. Do not score drywall or plasterboard when cutting material.
- 10. When covering the entire wall, seam the material out of the main writing and viewing areas of the wall.
- 11. Apply wallcovering to the substrate using a wallcovering smoother, wrapped with a soft cloth, to remove air bubbles. Do not use sharp edged smoothing tools. Smooth material on the wall from the middle to the outside edge.
- 12. Remove excess adhesive immediately after the wallcovering is applied. Clean entire surface with a warm mild soap solution, and clean soft cloths. Rinse thoroughly with water and let dry before using. Change water often to maintain water clarity.
- 13. Stop installation of material that is questionable in appearance and notify the manufacturer's representative for an inspection.

B. Self-adhesive Backing:

- 1. Walltalkers adhesive backed dry erase wallcovering is only recommended for use on surfaces impervious to moisture such as chalkboards, marker boards, glass, high-pressure laminates, or similar.
- 2. Acclimate wallcovering in the area of installation a minimum of twenty-four hours before installation.
- 3. Examine all materials for color, quantity, and quality as specified for the correct location prior to cutting.
- 4. Read and follow the instructions in the manufacturer's installation sheet contained in each roll of the dry erase wallcovering.
- 5. Do not crease or bend the wallcovering when handling.
- 6. To allow air bubble removal, use a pump spray bottle to dampen the surface to be covered.
- 7. Dampening solution = one half to one capful of mild detergent to 1 gallon (1.81kg) clean water.
- 8. Slowly remove release liner and smooth wall covering to the hanging surface using a wallcovering smoother wrapped with a soft cloth from the middle to the outside edge to remove air bubbles.
- 9. Stop installation of material that is questionable in appearance and notify the manufacturer's representative for an inspection.

3.4 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

SECTION 10 11 10 - DISPLAY CASES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Illuminated display cases.

1.2 DEFINITIONS

- A. Display Case: Glazed cabinet with adjustable shelves.
- B. Bulletin Board: Tackable surface enclosed in a glazed cabinet.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for bulletin boards and display cases.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show location of tack assembly seams and joints.
 - 2. Include sections of typical trim members.
 - 3. Wiring Diagrams: Power, signal, and control wiring for illuminated units.
- C. Samples for Initial Selection: For units with factory-applied color finishes as follows:
 - 1. Actual sections of tack assembly.
 - 2. Fabric swatches of vinyl-fabric-faced tack assemblies.

D. LEED Submittals:

- 1. Credit MR 4.1 and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - a. Contributions to this Credit include recycled content of aluminum and steel.
- 2. Credit EQ 4.1: Manufacturers' product data for adhesive and sealants used on the interior of the building, including printed statement of VOC content.
- 3. Credit EQ 4.4: Composite wood manufacturer's product data for each composite wood product used indicating that the bonding agent contains no added urea-formaldehyde and laminating adhesives.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for surface-burning characteristics of vinyl fabrics.
- F. Maintenance Data: For tack assemblies to include in maintenance manuals.

1.4 OUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain each type of product through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of bulletin boards and display cases and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

- D. Fire-Test-Response Characteristics: Provide fabrics with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify recessed openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating products without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hardboard: AHA A135.4, tempered.
- B. Particleboard: ANSI A208.1, Grade 1-M-1, made with binder containing no urea formaldehyde.
- C. Hardwood Plywood: HPVA HP-1, made with adhesive containing no urea formaldehyde.
- D. Natural Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish.
- E. Vinyl Fabric: FS CCC-W-408, Type II, burlap weave; weighing not less than 13 oz./sq. yd.; with flame-spread index of 25 or less when tested according to ASTM E 84.
- F. Extruded-Aluminum Bars and Shapes: ASTM B 221, Alloy 6063.
- G. Aluminum Tubing: ASTM B 429, Alloy 6063.
- H. Clear Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3, with exposed edges seamed before tempering, and 6 mm thick, unless otherwise indicated.
- I. High-Pressure Plastic Laminate: NEMA LD 3.
- J. Fasteners: Provide screws, bolts, and other fastening devices made from same material as items being fastened, except provide hot-dip galvanized, stainless-steel, or aluminum fasteners for exterior applications. Provide types, sizes, and lengths to suit installation conditions. Use security fasteners where exposed to view.

2.2 TACK ASSEMBLIES

A. Vinyl-Fabric-Faced Tack Assembly: 1/4-inch- thick, vinyl-fabric-faced cork sheet factory laminated to 1/4-inch- thick particleboard backing.

2.3 DISPLAY CASES

- A. Basis-of-Design: Vista M by Helmut Guenschel, Inc.
- B. Single and Double Sided.

- C. Operable glass door panels 3/8 inch thick safety glass (specify: laminated safety glass OR low-iron laminated safety glass), mounted in steel C-channel with dual action hinge. Compression seals for dust control. Frameless construction with no intermediate vertical support. In the closed position, adjacent glass panels shall remain in one plane. Adjustable alignment pins shall assure that the glass is properly closed and positioned. Structural components shall not be visible, fasteners shall be concealed and locking is provided by means of pin tumbler cylinder locks. Metal finish is factory primed and painted with two-component polyurethane.
- D. Hinges: Dual actuated hinges manufactured from high-strength aircraft aluminum and requiring no lubrication. When unlocked the door panel releases from the compression seal and rotates out and away from the display space providing full access. The pivot end of the panel does not rotate into the display space.
- E. Shelving: 3/8" tempered glass shelving located behind each door. Shelves supported on stainless steel rod hardware suspended from an anodized aluminum ceiling extrusion.
- F. Cabinet interior available in a painted finish or natural linen wrapped panels.
- G. Lighting: LED ceiling lighting for 120-240 volt standard with option for 277 volt systems.

2.4 FABRICATION

- A. Fabricate bulletin boards and display cases to requirements indicated for dimensions, design, and thickness and finish of materials.
- B. Fabricate shelf standards plumb and at heights to align shelf brackets for level shelves.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of work.
- B. Examine roughing-in for electrical power system to verify actual locations of connections before installation of illuminated units.
- C. Examine walls and partitions for proper backing for bulletin boards and display cases.
- D. Examine walls and partitions for suitable framing depth where recessed units will be installed.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- B. Recessed Units: Attach units to wall framing with fasteners at not more than 16 inches o.c. Attach trim over edges of recessed display cases and conceal grounds and clips. Attach trim with fasteners at not more than 24 inches o.c.
- C. Comply with requirements in Division 16 for connecting illuminated display cases. Install light switch in display case.
 - 1. After installation is complete, install new fluorescent lamps.
- D. Install display case shelving level and straight.

3.3 ADJUSTING AND CLEANING

A. Adjust doors to operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

SECTION 10 14 00 - SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowance for signs.
- B. Room and door signs.
- C. Plaque.
- D. Exterior exit identification signs.
- E. Dimensional characters.
- F. Indoor and Outdoor Educational Signage.

1.2 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 21 00 Allowances, for cash allowances affecting this section.
- B. Allowance amount covers purchase and delivery but not installation.

1.3 DESIGN REQUIREMENTS - INTERIOR SIGNS

- A. Permanent Rooms and Spaces:
 - 1. Provide signs identifying each room at each door.
 - 2. Type Styles:
 - a. Must be upper case and sans serif.
 - b. Must have a width to height ratio of between 3:5 and 1:1.
 - e. Must have a stroke width to height ratio of between 1:5 and 1:10.
 - 3. Tactile and Braille Characters: Characters raised a minimum of 1/32 inch and accompanied by Grade 2 braille.
 - 4. Character Height: Tactile characters must be between 5/8 inch and 2 inches in height.
 - 5. Pictograms (Symbols), if specified:
 - a. Minimum of a 6 inch high field or background; must be supplemented by upper case tactile descriptive verbiage and Grade 2 braille below pictogram.
 - b. No other graphic can invade the pictogram field.
 - c. Pictogram itself is not required to be tactile.
 - d. Provide pictogram and descriptive verbiage accompanied by Grade 2 braille at locations required.
 - 6 Finish and Contrast:
 - a. Matte (non-glare) characters and background; minimum contrast of 70 percent.
 - b. Light characters on dark background or dark characters on light background are acceptable.
 - 7. Mounting Conditions:
 - a. Mount 60 inches from finish floor to baseline of highest tactile letter on latch side of door.
 - b. Where no wall space is provided at the latch side of the door, place on nearest adjacent wall so that a person can approach to within 3 inches of signage without protrusions or swing of door.

B. Direction and Informational:

- 1. Type Styles:
 - a. May be upper and lower case and sans serif.
 - b. Shall have a width to height ratio of between 3:5 and 1:1.

- c. Shall have a stroke width to height ratio of between 1:5 and 1:10.
- 2. Tactile and Braille Characters: Not required for Type 2 signage.
- 3. Character Height: Characters shall be sized on viewing distance.
- 4. Pictograms (Symbols), if specified:
 - a. No tactile requirement.
 - b. Provide pictogram at locations designated in Signage Schedule and Drawings.
- 5. Finish and Contrast:
 - a. Matte (non-glare) characters and background; minimum contrast of 70 percent.
 - b. Light characters on dark background or dark characters on light background are acceptable.
- 6. Mounting Conditions:
 - a. Mount 60 inches from finish floor to baseline of highest tactile letter on latch side of door.
 - b. Where no wall space is provided at the latch side of the door, place on nearest adjacent wall so that person can approach to within 3 inches of signage without protrusions or swing of door.
 - c. Where signs are to be installed on glass, provide a blank sign to adhere to opposite side of the glass to obscure the backside of the signs.
- C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, sign types, lettering font, tactile designations, foreground and background colors, locations, overall dimensions of each sign and method of attachment.
- C. 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 the drawings, include the drawing room number on schedule along with the room number that will appear on the sign.
- D. Samples: Submit one sample of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips of the manufacturers full range of colors.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled in name groups.
- C. Store tape adhesive at normal room temperature.

PART 2 PRODUCTS

2.1 SIGNAGE FABRICATION

- A. Available Manufacturers:
 - 1. Best Sign Systems, Inc: www.bestsigns.com.
 - 2. Mohawk Sign Systems, Inc: www.mohawksign.com.

- 3. Bayuk Graphic Systems, Inc., Parkesburg, Pennsylvania.
- 4. Digital Color Graphics, Pittsburgh, Pennsylvania.
- 5. Supersine Company.
- 6. Acorn Sign Graphics: www.acornsign.com.
- 7. Adcorp Signs, Inc.

B. Fabrication Methods:

- 1. Plaque assembly to be plastic laminate construction; plastic laminate to be impervious to most acids, alkalies, alcohol, solvents, abrasives and boiling water; plastic laminate to be non-static, fire-retardant, and self extinguishing.
- 2. Approximately 0.080-inch thick non-glare matte acrylic face laminated to approximately 0.080-inch thick acrylic back plate with filler to create windows for inserts, if so indicated.
- 3. Non-tactile graphics to be subsurface or second surface applied signs; surface-applied graphics are not acceptable.
- 4. Painted surfaces will not be accepted.
- 5. Polycarbonate (0.03 inch thick) window inserts, if applicable; painted subsurface to match sign.
- 6. Tactile Copy Options:
 - a. Option 1: Individual plastic letters or characters of one solid color and chemically bonded by the use of a high strength solvent within a matched routed depression in sign face to create graphics which are raised a minimum of 1/32 inch from the face of sign; tactile characters 5/8 inch to 2 inches in height as required by Architect.
 - b. Option 2: Produced by blasting the laminate assembly removing the background material, and raising the characters and braille; the characters and braille are part of the original outer laminate color and do not require painting.
- 7. Braille (if applicable): Grade 2 braille engraved into face of sign.
- 8. Mechanically fasten plaque assembly to wall by use of a backplate, which will be secured to the outer assembly.
- 9. Corners as indicated; sides can be beveled or flat.
- 10. Colors to be selected by Architect, which include custom fabrications based on manufacturer's capabilities.

2.2 EXTERIOR EXIT IDENTIFICATION SIGNS

A. Minimum 0.063 inch thick aluminum plate with 3M engineer grade reflective sheeting, 30 inch x 30 inch, white background with black screen printed numbering and border.

2.3 CAST ALUMINUM DIMENSIONAL CHARACTERS

- A. Available Manufacturers:
 - 1. A. R. K. Ramos.
 - 2. Gemini Incorporated.
 - 3. Matthews International Corporation; Bronze Division..
 - 4. Metal Arts: Div. of L&H Mfg. Co.
 - 5. Nelson-Harkins Industries.
- B. Aluminum Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.
- C. Cast Characters: Produce characters with smooth flat faces, sharp corners, and precisely formed lines and profiles, free of pits, scale, sand holes, and other defects. Cast lugs into back of characters and tap to receive threaded mounting studs. Alloy and temper recommended by

sign manufacturer for casting process used and for use and finish indicated. Comply with the following requirements.

- 1. Character Material: Aluminum.
- 2. Mounting:
 - a. Typical: Concealed stud; projected 1 inch from wall with aluminum tube spacers.
- 3. Letter and Number Heights: Provide sizes indicated on Drawings.
- 4. Font: Provide font style indicated on the drawings, where style isn not indicated provide Helvetica Medium.
- 5. Color: Match Architect's sample.
- 6. Finish:
 - a. Typical Interior and Exterior: Powder coat.

2.4 MOLDED FOAM CHARACTERS

- A. Description: High-density polystyrene with a durable, laminated veneer on both sides.
- B. Basis-of-Design Product: Polyplastic Forms, Inc.; Durafoam letters and numbers, or comparable products by approved manufacturer.
- C. Unglazed Finish: Provide letters and numbers with matte finish where indicated.
- D. Glazed Finish: Provide letters and numbers with clear glazed finish applied to face of letters and numbers to achieve the look of formed plastic.
- E. Colors: To be selected by Architect from manufacturer's full range. Architect may choose one or more colors for this Project.
- F. Size: Height as indicated on Drawings; 1-1/2 inch thickness.
- G. Font: To be selected by Architect from manufacturer's full range.
- H. Mounting:
 - 1. Stud mount to walls with spindle and drilling temple.
 - 2. Provide monofilament for ceiling mounting.

2.5 GLASS MOUNTED GRAPHICH FILM - NO SMOKING

- A. Basis-of-Design: ALLSTATE Sign & Plaque, sticker; www.allstatesign.com.
- B. Application: No smoking sign at entrance doors.
- C. Mounting: Reverse applied to interior side of glass doors where indicated on plans.
- D. Material: Premium grade indoor/outdoor vinyl.
 - 1. Permanent adhesive bond.

2.6 PLAQUES

- A. Available Plaque Manufacturers:
 - 1. A. R. K. Ramos.
 - 2. Gemini Incorporated.
 - 3. Matthews International Corporation; Bronze Division..
 - 4. Metal Arts; Div. of L&H Mfg. Co.
 - 5. Nelson-Harkins Industries.
- B. Bronze Castings: ASTM B 584, Alloy UNS No. C86500 (No. 1 manganese bronze).
- C. Cast Plaque: Provide castings free of pits, scale, sand holes, and other defects, as follows:
 - 1. Plaque Material: Bronze.
 - 2. Background Texture: Manufacturer's standard pebble or leatherette texture.

- 3. Border Style: Projected bevel.
- 4. Mounting: Concealed studs, noncorroding for substrates encountered.
- 5. Thickness: 3/4 inch.
- D. Cast-Bronze Plaque Finishes: Exposed surfaces free of porosity, burrs, and rough spots; with returns finished with fine-grain air blast.
 - 1. Raised Areas: Hand-tool and buff borders and raised copy to produce manufacturer's standard satin finish.
 - 2. Background Finish: Dark oxidized.
 - 3. Clear Protective Coating: Coat exposed surfaces of copper alloys with manufacturer's standard, clear organic coating specially designed for coating copper-alloy products.
- E. Plaque Schedule: One plaque.
 - 1. Plaque Size: 18 inches wide by 12 inches high.
 - 2. Text Style: As selected by Architect from manufacturer's standards.
 - 3. Text: Will be provided by Architect.
 - 4. Location: As indicated.

2.7 EDUCATIONAL SIGNAGE

- A. Interior Signs:
 - 1. Basis of Design: Apco Arcadia 2000 Series.
 - 2. Size: 8-1/2"H x 12"L.
 - 3. Holder and End Caps: ARH11-215H Natural satin anodized aluminum.
 - 4. Insert:
 - a. ClearLens 0.40" PETG non-glare ARI-11-215H-CL.
 - 5. Backer: Lumicor; pattern to be selected by Architect, size 12"h X 15"w.
 - 6. Mounting: Wall and Post mounted.
 - 7. Accessories: Suction Cup Removal Tool (SCT).
 - 8. Quantity: 30.
 - 9. Locations: To be determined by Architect and Owner
- B. Exterior Signs:
 - 1. Basis of Design: EnviroSIGNS; Single Pedestal.
 - 2. Panel Size: 18" W x 24" H.
 - 3. Mounting: Mounted to concrete via 6 inch by 6 inch mounting plate.
 - 4. Quantity: 2.
 - 5. Locations: To be determined by Architect and Owner.
 - 6. Graphics to be provided by Architect.

2.8 ACCESSORIES

- A. Exposed Screws: Chrome plated; tamper-proof.
- B. Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions after surfaces are finished.
- B. Install neatly, with horizontal edges level, plumb and true, and in correct relation to adjoining Work.
- C. Locate signs where indicated:
 - 1. If no location is indicated obtain Owner's instructions.
- D. Protect from damage until Substantial Completion; repair or replace damage items.
- E. Dimensional Characters: Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.
- F. Cast-Metal Plaque: Mount plaque using standard fastening methods to comply with manufacturer's written instructions for type of wall surface indicated.
 - 1. Concealed Mounting: Mount plaque by inserting threaded studs into tapped lugs on back of plaque. Set in predrilled holes filled with quick-setting cement.

3.3 CLEANING

A. Wash surfaces following installation.

SECTION 10 14 53 – TRAFFIC SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Requirements of the General Provisions apply to all work under this section.
- B. Baltimore City Department of Public Works Standard Details for Construction dated March 2008 and as amended.
- C. Throughout the specifications, types of materials may be specified by manufacturer's name and catalogue number in order to establish standards of quality and performance and not for the purpose of limiting competition. Alternate methods and/or materials may be submitted to the Architect for consideration. Those judged to be equal to that specified will receive written approval.

1.2 SUMMARY

- A. Furnish all labor, materials, equipment and services necessary for and reasonably incidental to complete the site signs work as indicated on drawings or specified, including but not limited to the following:
 - 1. Exterior Parking Signs
 - 2. Exterior Traffic Control Signs.

1.3 QUALITY ASSURANCE

- A. Uniformity of Manufacturer: For each sign form and graphic image process indicated, furnish products of a single manufacturer.
- B. All signage to comply with A.D.A. requirements.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacture and design of each sign component, including graphics.
 - 1. Submit full-size sample units, if requested by Architect. Acceptable units may be installed as part of the work.
- C. Shop Drawings: Submit shop drawings for fabrications and erection of specialty signs. Include plans, elevations and large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Andco Industries Corp.
- B. A.C. Davenport & Son Co.
- C. A.S.I. Sign Systems
- D. Spanjer Brothers, Inc.
- E. The Supersine Company
- F. Southwell Company

2.2 GENERAL REQUIREMENTS

- A. All letters shall be Helvetica Medium; upper case.
- B. Letters shall be centered on signs.
- C. Panel backgrounds shall be colored from manufacturer's standards with matte finish.

2.3 MATERIALS

A. Aluminum Casting: Alloy and temper recommended by aluminum producer or finisher for typed of use and finish indicated and with not less than the strength and durability properties specified in ASTM B 221 for 6063 TS

2.4 EXTERIOR PARKING SIGNS

A. Type: Silk screened letters and symbol on 0.125" dark blue baked enamel color aluminum message panel, supported on 1-1/2" square steel post set in concrete footing.

2.5 EXTERIOR TRAFFIC CONTROL SIGNS

A. All signs shall be in accordance with the "Manual on Uniform Traffic Control Devices for Streets and Highways". Revision Number 2, dated March, 1986 and as amended.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install sign units and components at locations indicated on the drawings securely mounted with concealed theft resistant fasteners, unless otherwise indicated. Attach signs to substrates in accordance with manufacturer's instructions.
- B. Install sign units level, plumb and at proper height. Cooperate with other trades for installation of sign units to finish surfaces. Repair and replace damaged units as directed by Architect.
- C. Installation of Exterior Parking and Traffic Control Signs:

- 1. Erect sign plumb with top as indicated on the drawings.
- 2. Anchor to concrete footing with concealed anchors in accordance with manufacturer's recommendations.

3.2 CLEANING AND PROTECTION

A. At completion of installation, clean soiled sign surface in accordance with manufacturer's instructions. Protect units from damage until acceptance by Owner.

SECTION 10 21 13.19 - PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic toilet compartments.
- B. Urinal screens.

1.2 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Product Data: Provide data on panel construction, hardware, and accessories.
- D. Samples: Submit two samples of partition panels, 3 x 3 inch in size illustrating panel finish, color, and sheen.
- E. LEED Submittals: Document the use of recycled materials and local/regional materials as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, and Section 01 61 16.
- F. Test Reports: Indicating compliance with NFPA 286.

1.3 EXTRA MATERIALS

A. Provide extra stall doors in the amount of 5 percent of each color installed with all associated hardware.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Comtec or Santana products by Scranton Products.
- B. Bradley Corporation.
- C. Hadrian.
- D. Global Partitions.

2.2 SOLID PLASTIC TOILET COMPARTMENTS

- A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), floor-mounted unbraced.
- B. Doors:
 - 1. Thickness: 1 inch.
 - 2. Width: 24 inch.
 - 3. Width for Handicapped Use: 36 inch, out-swinging.
 - 4. Height: 55 inch.
- C. Panels:
 - 1. Thickness: 1 inch.
 - 2. Height: 55 inch.
- D. Pilasters:
 - 1. Thickness: 1 inch.
 - 2. Width: As required to fit space; minimum 3 inch.

2.3 COMPONENTS

- A. Toilet Compartments: Solid molded high density polyethylene (HDPE) plastic panels, doors, and pilasters, floor-mounted unbraced.
 - 1. Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
 - 2. Recycled content products are preferred.
 - 3. Color: To be selected from manufacturer's entire range including marble and granite selections.
- B. Door and Panel Dimensions:
 - 1. Thickness: 1 inch.
 - 2. Door Width: 24 inch.
 - 3. Door Width for Handicapped Use: 36 inch, out-swinging.
 - 4. Height: Manufacturer's standard not less than 55 inch.
 - 5. Thickness of Pilasters: 1 inch.
- C. Urinal Screens: Wall mounted with continuous panel brackets and pilaster anchored to floor.
 - 1. Maximum dimension from finished floor to bottom of urinal screen: 12 inches.
 - 2. Minimum dimension from finished floor to top of urinal screen: 60 inches.
 - 3. Minimum depth of urinal screen to be 18 inches; or from finished wall to a minimum of 6 inches beyond the outermost front lip of the urinal, whichever is greater.

2.4 ACCESSORIES

- A. Pilaster Shoes: Formed chromed steel with polished finish, 3 in high, concealing floor fastenings.
 - 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Hollow anodized aluminum tube, 1 x 1-5/8 inch size, with anti-grip strips and cast socket wall brackets.
- C. Pilaster Brackets: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear anodized aluminum.
- D. Wall Brackets: Continuous type, satin stainless steel or extruded aluminum.
- E. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 - 1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
 - 2. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.
- F. Hardware: Polished stainless steel:
 - 1. Continuous hinges self-closing; stainless steel.
 - 2. Door Latch: Slide type with exterior emergency access feature.
 - a. Accessible stall door to be equipped with a slide latch that does not require gripping or twisting and shall be slotted to permit emergency access
 - 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.
 - a. Provide two door pulls (one each side) at accessible compartments to comply with ADA requirements.

- G. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer doors and partitions.
- H. Provide wall stop at out-swinging doors where applicable.

2.5 FABRICATION

- A. Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions.
- B. Make provisions for setting and securing continuous head rail at top of each pilaster.
- C. Provide shoes at pilasters to conceal supports and leveling mechanism.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

3.2 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.3 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 out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.
- D. Adjust latching hardware for proper operation.

SECTION 10 21 23 - CUBICLE CURTAINS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface mounted overhead metal curtain track and guides.
- B. Curtains.

1.2 REFERENCE STANDARDS

A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2015

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics and track system, including carriers.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Samples: Submit 12 x 12 inch sample patch of curtain cloth with representative hem stitch detail, heading with reinforcement, and carrier attachment to curtain header.
- E. Samples: Submit 12 inch sample length of curtain track including typical splice and mounting.
- F. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Accept curtain materials on site and inspect for damage.
- B. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 Specifications.
- C. Store curtain materials on site and deliver to Owner for installation when requested.

1.5 EXTRA MATERIALS

- A. See Section 01 60 00 Product Requirements, for additional provisions.
- B. Provide two of each curtain size.
- C. Provide ten extra carriers.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Cubicle Track and Curtains:
 - 1. A. R. Nelson Co: www.arnelson.com.
 - 2. C/S General Cubicle: www.c-sgroup.com/cubicle-track-curtains.
 - 3. Imperial Fastener Co., Inc: www.imperialfastener.com.

2.2 TRACKS AND TRACK COMPONENTS

A. Track: Extruded aluminum sections; one piece per cubicle track run; channel profile.

- 1. 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.
- 2. Track End Stop: To fit track section.
- 3. Track Bends: Minimum 18 inch radius; fabricated without deformation of track section or impeding movement of carriers.
- 4. Finish on Exposed Surfaces: White enamel finish.
- B. Curtain Carriers: Nylon roller to accurately fit track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal; one carrier for each 6 inches of fabric width.

2.3 CURTAINS

- A. All Curtain Materials:
 - 1. Naturally flame resistant or flameproofed; capable of passing NFPA 701 test.
 - 2. Curtain: Close weave polyester; anti-bacterial, self deodorizing, sanitized, and preshrunk.
- B. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, same color as curtain.
- C. Curtain Fabrication:
 - 1. Manufacture curtains of one piece, sized 10 percent wider than track length. Terminate curtain 12 inches from floor.
 - 2. Include open mesh cloth at top 24 inches of curtain for room air circulation.
 - 3. Curtain Heading: Triple thickness not less than 1 inch and not more than 1-1/2 inches wide, with metal grommet holes for carriers 6 inches on center, double fold bottom hem not less than 1 inch and not more than 1-1/2 inches wide with lead weights included. Lock stitch seams in two rows. Turn seam edges and lock stitch.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.
- B. Verify that field measurements are as indicated.

3.2 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line.
- B. Install end cap and stop device.
- C. Install curtains on carriers ensuring smooth operation.

SECTION 10 22 28 - VERTICAL BI-FOLD DOOR

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Doors for this project will consist of bi-fold doors where indicated on the drawings.

1.2 DESIGN CRITERIA

- A. The bi-fold doors shall be designed to the same loading requirements for live, dead and wind loads as the building.
- B. The doors shall be engineered to resist all anticipated loads without sagging, bowing or conflicting with its smooth and efficient operation.
- C. The design shall be furnished, approved and sealed by a professional engineer registered in the State of Maryland and shall include the weight of the cladding material.
- D. The building header shall be designed to accommodate horizontal and verticle building deflections to support the bi-fold door in all positions with the lateral bracing.
- E. The building's door columns shall be framed of the proper design and size to reinforce the opening with lateral bracing and to carry all loads and vibrations imposed thereon.

1.3 GENERAL / ELECTRICAL REQUIREMENTS

- A. The building contractor shall furnish and install a prewired electrical door operating mechanism to control each bi-fold door.
- B. The contractor is responsible and required to completely install the prewired electrical door operating mechanism, push button controls, devices and electrical conduit and wiring to the door operating controls.
- C. The electrical door mechanism and control shall be field wired by the contractor.
- D. Control panel with up/down/off switch pre-wired to motor, and over-ride controls with the required number of adequately sized insulated electrical conductors.

1.4 GENERAL / ELECTRIC POWER OPERATOR - FOR THE BI-FOLD DOORS

- A. All electrical controls and devices shall conform to the requirements of the current National Electrical Code 513, NEMA, and be UL approved.
- B. Provide UL Listed Electric Operator, size and type as recommended by the manufacturer.
- C. The operator is furnished complete and consists of a motor and factory-wired control panels consisting of main fused disconnect switch, magnetic reversing starters, limit switches and push button controls, control circuit transformers, relays, timing devices, and warning devices.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's complete product data sheets for each Bi-fold Door, plus product data and installation instructions. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, Include the following:
 - 1. Summary of forces and loads on walls and jambs.
 - 2. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
- B. Shop Drawings: Submit job specific shop drawings for approval prior to fabrication. Include detailed plans, elevations, details of framing members, required clearance, anchors and

accessories. Include relationship with adjacent materials. The make and type of door, operators and controls shall be clearly shown. Door weight, method of suspension, operation, and all fastenings shall be indicated.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain Bi-Fold doors through one source from a single manufacturer.
- B. Manufacturer Qualifications: Engage a firm experienced in manufacturing Bi-Fold doors similar to those indicated for this Project and with a record of successful in-service performance.
- C. Installer Qualifications: Engage an experienced installer who is an authorized representative of the door manufacturer for both installation and maintenance of units required for this Project.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of Bi-Fold doors and accessories. Other manufacturers' systems with equal performance and dimensional characteristics may be considered.
- E. Pre-Installation Conference: Schedule a pre-installation conference prior to commencement of field operations that might affect installation of bi-fold doors to establish procedures for maintaining optimum working conditions, and to coordinate this work with related and adjacent work.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in manufacturer's labeled protective packages. Store and handle in strict compliance with manufacturer's written instructions and recommendations. Protect from damage from weather, excessive temperatures and constructions operations.
- B. Inspect vertical bi-fold doors upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect. Other wise, remove and replace damaged items as directed.
- C. Place bi-fold door frame units on minimum 4" high wood blocking. Store doors components & Packages at building site under cover. Avoid use of non vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately.
- D. The contractor shall store the sheet, panels, components and other manufactured items so that they will not be damaged or deformed. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials which might cause staining.

1.8 WARRANTY

- A. The Contractor shall warrant the door to be free of defects in accordance with the General Conditions, except the warranty shall be extended by manufacturer's 2-year written warranty against defects in materials and workmanship, against problems which arise through normal anticipated usage of the door during the warranty period. The warranty shall be signed by the manufacturer.
- B. Additional Warranty On The Straps
 - 1. In addition to the warranty specified above, the door manufacturer shall warrant the original lift straps for a period of five years, against defects in material.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. The bi-fold doors supplied by a manufacturer who is regularly engaged in the manufacture of doors similar to the ones required for this project for a minimum of ten years, and upon request from the owner provide a list of completed projects. Bi-fold door shall be as manufactured by Schweiss Bi-Fold Doors; www.bifold.com.
- B. Approved equal.

2.2 SIZE OF DOOR

A. Width and Height as indicated on the drawings.

2.3 BI-FOLD DOOR FRAMEWORK- FABRICATION / CONSTRUCTION REQUIREMENTS

- A. Doors shall be of the electrically operated bi-fold canopy type and shall be integral with the building design.
- B. When in the open position the doors shall have a slight slope to direct drainage away from the building.
- C. Door shall be hinged horizontally at the top and center, and be arranged to open by moving frame out & up.
- D. Door frames shall have prelocated top hinges to align with the building structural members as detailed.
- E. Door shall be self contained with only the top hinges, bottom door rollers and column followers/ wind rails.
- F. The door framework shall consist of jig welded steel tube sections engineered by the door manufacturer to resist all anticipated loads without sagging, bowing or conflicting with its smooth operation.
- G. Structural steel door framing members shall be ASTM A500 Grade B square structural welded steel tubing.
 - 1. All labor, materials, accessories, equipment and services necessary to furnish a complete installation of a bi-fold door as indicated by the manufacturer. Including frame, sections, brackets, guides, tracks, hardware, operators and installation instructions.
- H. Shop connections shall be welded.
- I. Field connections shall be bolted.

2.4 DRIVESHAFT / LIFT DRUMS

- A. The solid steel driveshaft with lift drums mounted on bottom cord of door runs continuously along entire door width providing an even lift of the door at all times.
- B. The drive shaft shall be attached to the door frame with (greaseable) bearing mounts wherever there is a cable drum installed, to minimize stress on the shaft.
- C. Solid Driveshaft and lift drums shall be in sufficient amount to give 5:1 safety factor.

2.5 LIFTING METHODS

- A. Lift Straps:
 - 1. The door power unit shall be operated by a system of lifting straps (NOT CABLES), lifting drums and drive shafts.

- 2. Lift Straps attached to a retainer on the upper door frame passing through a strap guide attached at the top chord of the door frame, thereby transmitting forces directly to header of building & relieving door of unnecessary stresses.
- 3. The Lift Straps shall have adjustable slack take-up device to keep proper tension on each Lift Strap.
- 4. The lift drums must be properly shielded to avoid any potential hazards to people.
- 5. Lift Straps and Lift Drums shall be manufacturer's standard sized in sufficient amount to give 5:1 saftey factor.

2.6 HEAVY DUTY HINGES

A. Heavy Duty Steel Hinges furnished complete. Each Hinge set shall be 10.50" wide, pins shall be 11/16" diameter minimum.

2.7 DOOR TRUSS

- A. Internal Truss Standard
 - 1. An extra heavy duty center truss shall be installed in the center of the interior side.
 - 2. There will be a truss at the base of the door to provide extra strength.

2.8 HEAVY DUTY SIDE ROLLERS

A. The bi-fold doors shall include 3" Heavy Duty minimum guide rollers with sealed bearings on bottom of door at jamb location.

2.9 COLUMN FOLLOWERS / WIND RAILS

- A. System provided by the door manufacture to hold the base of the door securely against the building when the door is in the closed position.
 - 1. Solid square columns secure only in the closed position = Wind Rails.

2 10 WIND PINS

- A. Automatic Wind Pins
 - 1. Center wind pins 1" diameter minimum must automatically engage/disengage.

2.11 MANUAL LATCHING SYSTEM

- A. Standard Manual Latch
 - 1. The latching system shall be provided on both sides of the doors.
 - 2. A manually latching system will be furnished so that the door is manually unlocked before the door can be opened and manually relocked after the door is in the closed position.

2.12 PAINT

- A. The door frame members and parts shall be factory primer finished with gray primer.
- B. Frame members are to be field painted, color to be selected by Architect.

2.13 TOP & BOTTOM RUBBER SEALS

- A. Provide manufacturer's standard seal continuous at top and bottom of each door.
- B. The door shall be equipped with neoprene weather stripping at heads and jambs to prevent flow of moisture into the door installation. Sills shall have a special fabric reinforced high grade rubber astragal. The entire door perimeter shall be weather tight.
- C. Weather Seal Kit

D. The sides, and center of each bi-fold can be sealed off with weather stripping. The center of the door must have a self sticking foam cusion seal. The entire door perimeter must be weather tight.

2.14 BI-FOLD DOOR ELECTRIC POWER OPERATOR - BOTTOM DRIVE

- A. Location of Power Operator
 - 1. Motor shall be located on bottom chord of door frame.
- B. Electrical Controls
 - 1. All electrical controls and devices shall be designed to meet National Electrical Code Section 513.
 - 2. All controls are pre-wired and factory tested.

2.15 ELECTRIC MOTOR / VOLTAGE / PHASE

- A. Electric Motor / Voltage / Phase
 - 1. Service: 240 VAC, single phase, 3 wire service.
 - 2. Single Phase Motor's shall be enclosed capacitor start.
 - 3. Single phase, 240 volt electric motor with overload protection direct mounted to a gear reduction box and winding drum.
 - 4. The size of the motor shall be as recommended by the manufacturer.
 - 5. Door operator shall be pre-wired at factory complete with 24 V.A.C. control system.

B. Gear Motor

- 1. The gear motor is equipped with an electric brake, which will stop and hold door in any position of door travel.
- 2. Provide high starting torque, reversible, continuous duty, class A insulated, electric motors complying with NEMA MG 1, with overload protection, sized to start, accelerate, and operate door in either direction, from any position.
- 3. A magnetic starter, with 24v control unit for reliability is standard.
- 4. Design operator so motor may be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.

2.16 CONTROL STATION

- A. 2 Button Constant Hold Control Station for opening & closing Bi-fold door.
 - 1. 2-button constant contact dead man switch, prevents operator from leaving control panel while door is in motion, either up or down.
 - 2. When the operator takes his hand off the up /down button, the door immediatly stops regardless of its opening / closing position.
 - 3. The motor automatically stops when the door reaches either the full open or closed position.

B. Limit Switches

- 1. Heavy duty limit switch box shall be weatherproof.
- 2. Heavy duty limit switch box shall provide adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- 3. Safety edges shall not be used as limit switches.

2.17 ACCESSORIES

- A. Top Override Safety Switches
 - 1. Upper override switch that disconnects power to door if upper limit fails or if limits are overridden.

2. This safety feature is designed to prevent the door from traveling beyond it's recommended clear opening height. If the door passes its full clear opening height, it will activate the override and stop the door automatically.

B. Side Latch Safety Switches

- 1. Side Latch Safety Switches eliminate possible damage if door is opened while in locked position.
- 2. These switches are designed to prevent the door from operating while the side latches are locked in the closed position.

C. Warning Lights And Horn

1. Warning Lights And Horn, which alerts persons in the area that door is opening or closing.

2.18 ELECTRICAL DISCONNECT

- A. Provide Electrical Disconnect to completely disable the door, for service, maintenance, emergency backup operations.
- B. Mount disconnect so it is accessible from floor level.

PART 3 - EXECUTION

3.1 EXECUTION

A. Examination

- 1. Examine wall and overhead areas, including opening framing and blocking, with Installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work of this section.
- 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

- 1. Door manufacturer is required to coordinate with the metal building manufacturer in the development of the exact installation details, and provide weights and door loadings to building manufacturer.
- 2. Install door, track, and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawing, manufacturer's written instructions, and as specified.
- 3. Fasten vertical track assembly to framing at not less then 24 inches o.c. Hang horizontal track, hinges from structural overhead framing with angle or channel hangers welded and/or bolt fastened in place. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track, hinges and door-operating equipment.

B. Top and Bottom Limits Settings

1. Each bi-fold door has a recommended clear opening setting, specified by the manufacture. Do not over travel the door beyond the recommended setting.

C. Exterior wall panels

1. Contractor to install the same exterior wall panels that are on the building, use the same type on the bi-fold doors. Install the proper trims that are recommended by the manufacturer.

D. Apply Proper Safety Markings

1. Apply Proper Markings for any potentially hazardous locations related to the operation of the door.

2. Follow the pictorial diagram included in the door installation manual.

E. Installing Warning Labels

- 1. Furnish warning labels for any potentially hazardous locations related to the operation of the door.
- 2. Fasten warning labels to the bi-fold door frame and by the operator's station in accordance with manufacturers instructions.

3.3 ELECTRICAL WORK - Contractor is responsible for:

- A. The contractor is responsible and required to completely install the prewired electrical door operating mechanism, push button controls, devices and electrical conduit & wiring to the door operating controls.
- B. Detail wiring for power, signal, and control systems.
- C. Install bi-fold doors in accordance with manufacturers instructions.
- D. Adjust & Clean
 - 1. Lubricate, test, and adjust doors to operate easily, free from warp, twist, or distortion and fitting weather tight for entire perimeter.
- E. Prime Coat Touch Up:
 - 1. Immediately after erection, sand smooth any rusted or damaged areas of prime coat.
 - 2. Touch-up damaged coating and finishes and repair minor damage.
 - 3. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned, and apply touch up of compatible air drying primer.

F. Final Adjustments:

- 1. Lubricate bearings and moving parts, adjust open and closed limits & doors to operate easily, free from warp, twist, or distortion and fitting weathertight for the entire perimeter.
- 2. Check and readjust operating finish hardware items, leaving vertical bi-fold doors undamaged and in complete and proper operating condition.

3.4 DEMONSTRATION

- A. Startup Services: Engage a qualified authorized service representative to perform startup services and to train Owner's maintenance personnel as specified below:
 - 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls & equipment.
 - 2. Train Owner's maintenance personnel on procedures and schedules related to startup and shut down, operating, troubleshooting, servicing, and preventative maintenance.
 - 3. Review data in the installation & maintenance manuals.
 - 4. Schedule training with Owner at least 7 days advance notice.

SECTION 10 26 00 - PROTECTIVE WALL COVERING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the following types of wall protection systems:
 - 1. Wall Covering

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

1.3 SUBMITTALS

- A. General: Submit the following in accordance with conditions of contract and Division 1 specification section 01 30 00 "Administrative Requirements".
- B. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- C. Shop drawings showing locations, extent and installation details of wall covering products.
- D. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture, pattern and thickness:
 - 1. Sample of each product specified.
- E. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- F. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.4 OUALITY ASSURANCE

- A. Installer qualifications: Engage an installer who has no less than 3 years experience in installation of systems similar in complexity to those required for this project.
- B. Manufacturer's qualifications: Not less than 5 years experience in the production of specified products and a record of successful in-service performance.
- C. Code compliance: Assemblies should conform to all applicable codes including IBC and Life Safety.
- D. Fire performance characteristics: Provide engineered PETG wall protection system components identical to those tested in accordance with ASTM E84 for Class A characteristics listed below:
 - 1. Flame spread: 25 or less
 - 2. Smoke developed: 450 or less
- E. Impact Strength: Provide assembled wall protection units that have been tested in accordance with the applicable provisions of ASTM F476.
- F. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.
- G. Color match: Provide wall protection components that are computer controlled within manufacturing tolerances and typical limitations of digital printing color matching.
- H. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Store materials in original, undamaged packaging in a clean, dry place out of direct sunlight and exposure to the elements. A minimum room temperature of 40°F (4°C) and a maximum of 100°F (38°C) should be maintained.
- C. Materials must be stored flat.

1.6 PROJECT CONDITIONS

- A. Materials must be acclimated in an environment of 65-75°F (18-24°C) for at least 24 hours prior to beginning the installation.
- B. Installation areas must be enclosed and weatherproofed before installation commences.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Interior surface protection products specified herein and installed on the submittal drawings shall be manufactured by Construction Specialties, Inc.

2.2 MATERIALS

- A. Engineered PETG: Rigid sheet should be high impact Acrovyn by Design with nominal .040" (1.02mm) thickness and supplied in 4' x 8' or 10' (1.22m x 2.44m or 3.05m) sheet sizes in standard Suede texture. High definition digital file reverse printed on clear sheet and sealed with protective backer. Custom artwork to be provided by Architect.
- B. Provide color-matched caulk and metal trims for joints/transitions.

2.3 FABRICATION

A. General: Fabricate wall covering to comply with requirements indicated for design, dimensions, detail, finish and sizes.

2.4 ACCESSORIES

A. Acrovyn Wall Covering shall be furnished as a complete packaged system, containing all adhesive. Adhesive shall be water based and non-hazardous. Water based primer is also available for purchase.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations using approved adhesive.
- B. Temperature at the time of installation must be between 65-75°F (18-24°C) and be maintained for at least 48 hours after the installation to allow for proper adhesive set up.
- C. Relative humidity shall not exceed 80%.
- D. Do not expose wall covering to direct sunlight during or after installation. This will cause the surface temperature to rise, which in turn will cause bubbles and delamination.

3.4 CLEANING

- A. General: Immediately upon completion of installation, clean wall covering and accessories in accordance with manufacturer's recommended cleaning method.
- B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

SECTION 10 26 23 - PROTECTIVE WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the following types of wall protection systems:
 - 1. Wall Panels

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. Underwriters Laboratories (UL)

1.3 SUBMITTALS

- A. General: Submit the following in accordance with conditions of contract and Division 1 specification section 01 30 00 "Administrative Requirements".
- B. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- C. Shop drawings showing locations, extent and installation details of wall panel products.
- D. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture, pattern and thickness:
 - 1. Sample of each product specified.
- E. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- F. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.4 OUALITY ASSURANCE

- A. Installer qualifications: Engage an installer who has no less than 3 years experience in installation of wall panels similar in complexity to those required for this project.
- B. Manufacturer's qualifications: Not less than 5 years experience in the production of specified products and a record of successful performance.
- C. Code compliance: Assemblies should conform to all applicable codes including IBC, UBC, SBCCI, BOCA, Life Safety and CA 01350.
- D. Fire performance characteristics: Provide engineered PETG wall panels tested in accordance with ASTM E84 for Class B characteristics listed below:
 - 1. Flame spread 75 or less
 - 2. Smoke developed: 450 or less
- E. Impact Strength: Provide assembled wall protection units that have been tested in accordance with the applicable provisions of ASTM F 476.
- F. Chemical and stain resistance: Provide wall panels with chemical and stain resistance in accordance with ASTM D543.
- G. Color match: Provide wall protection components that are computer controlled within manufacturing tolerances and typical limitations of digital printing color matching.
- H. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the project site in unopened packaging clearly labeled to show manufacturer.
- B. Store materials in original, undamaged packaging in a clean, dry place out of direct sunlight and exposure to the elements. A room temperature of 40-100°F (4-38°C) should be maintained.
- C. Materials must be stored flat.

1.6 PROJECT CONDITIONS

- A. Materials must be acclimated in an environment of 65-75°F (18-24°C) for at least 24 hours prior to beginning the installation.
- B. Installation areas must be enclosed and weatherproofed before installation commences.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design: Interior surface protection products specified herein and installed on the submittal drawings shall be manufactured by Construction Specialties, Inc.

2.2 MATERIALS

- A. Engineered PETG Wall Panels to be Acrovyn by Design by Construction Specialties Inc: Wall panels to be manufactured of .040" (1.02mm) thick Acrovyn 4000 sheet, Suede texture, factory-bonded to the face side of a 3/8" (9.53mm) thick particle board core. The backside of the panel to be laminated with a moisture resistant barrier.
 - 1. C/S Acrovyn by Design Unfinished Edge Wall Panel with custom artwork provided by Architect to be embedded digital imagery. Trim options to include aluminum picture frame [1/4" (6.35mm) visible] or aluminum thin trim [1/16" (1.59mm) visible] factory installed on panel. Standard maximum panel size to be 47" (1193.8mm) x 119" (3022.6mm).
 - 2. Acrovyn by Design Wall Panels with Wrapped Square Edge with standard pattern colorways and with custom artwork to be provided by architect for embedded digital imagery. Overall panel thicknesses of standard 3/4" with demountable Sure SnapTM System mounting hardware mechanically fastened to wall and preinstalled on panel.
 - 3. Trims to be nominal .040" (1.02mm) thick rigid sheet formed over shaped MDF board supplied in 9' 6" (2.9m) lengths and field-mitered.
 - a. Wall base trims 1/2" (12.7mm) thick in 4", 6" or 8" (101.6mm, 152.4mm or 203.2mm) widths.

2.3 WALL PANEL MOUNTING

- A. Construction grade adhesive to be supplied by manufacturer.
- B. Sure snap mounting system.

2.4 REVEALS

- A. Reveal options: Reveal spacing to be as narrow or wide as the following allow:
 - Painted wall.
 - 2. Acrovyn reveals to consist of 1 1/2" (38.1mm) wide strips of .040" sheet.
 - 3. Metal reveals 1 1/2" (38.1mm) wide x .024" thick.

2.5 FABRICATTION

A. General: Fabricate wall panels to comply with requirements indicated for design, dimensions, detail, finish and sizes.

2.6 ACCESSORIES

A. Acrovyn by Design Wall Panels shall be furnished as a complete packaged system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations and the required field verified dimensions.
- B. Temperature at the time of installation must be between 65-75°F (18-24°C) and be maintained for at least 48 hours after the installation to allow for proper adhesive set up.
- C. Relative humidity shall not exceed 80%.
- D. Do not expose wall panels to direct sunlight during or after installation. This will cause the surface temperature to rise, which in turn will cause bubbles and delamination.

3.4 CLEANING

- A. General: Immediately upon completion of installation, clean wall panels and accessories in accordance with manufacturer's recommended cleaning method.
- B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Accessories for toilet rooms and utility rooms.
- B. Grab bars.

1.2 REFERENCE STANDARDS

- A. ASTM A269/A269M Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015.
- B. ASTM A666 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- C. ASTM B456 Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2011.
- D. ASTM C1036 Standard Specification for Flat Glass; 2011.
- E. ASTM C1503 Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. LEED Submittals: Provide product data for adhesives and sealants indicating VOC content in g/L; comply with requirements of Section 01 61 16.

1.4 COORDINATION

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. A & J Washroom Accessories Inc: www.ajwashroom.com.
- B. American Specialties, Inc: www.americanspecialties.com.
- C. Bradley Corporation: www.bradleycorp.com.
- D. Bobrick.
- E. All items of each type to be made by the same manufacturer.

2.2 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.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- 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, Type 304 or 316.
- E. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- F. Adhesive: Two component epoxy type, waterproof.
- G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FINISHES

- A. Stainless Steel: No. 4 Brushed finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.
- C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

2.4 TOILET ROOM ACCESSORIES

- A. Grab Bars: Stainless steel, nonslip grasping surface finish.
- B. The design for each accessory is based on products indicated on the Drawings.

2.5 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. Mop/broom holders: 3 spring-loaded rubber cam holders at shelf front.
 - 2. Length: Manufacturer's standard length for number of holders/hooks.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
- D. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C Accessories

1.2 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, and location.
- C. Product Data: Provide extinguisher operational features.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. JL Industries, Inc: www.jlindustries.com.
- B. Larsen's Manufacturing Co: www.larsensmfg.com.
- C. Potter-Roemer: www.potterroemer.com.

2.2 FIRE EXTINGUISHERS

- A. Fire Extinguishers General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Dry Chemical Type Fire Extinguishers: Steel tank, with pressure gage.
 - 1. Class Multi-purpose 4-A:80-B:C.
 - 2. Size 10 pounds.
 - 3. Finish: Baked enamel, color as selected.
- C. Purple-K Dry-Chemical Type in Aluminum Container (for Grease Laden Vapors at Kitchen):
 - 1. Class: UL-rated 30-B:C.
 - 2. Size: 5-lb nominal capacity.
 - 3. Potassium bicarbonate-based dry chemical in enameled-aluminum container.

2.3 FIRE EXTINGUISHER CABINETS

- A. Description: Formed steel box with aluminum trim and door.
 - 1. Fire-Rated Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Cabinet Configuration: Recessed type.
 - 1. Sized to accommodate accessories.
 - 2. Provide semi-recessed type at locations where wall thickness is narrower than a fully recessed cabinet.

- 3. Trim: Returned to wall surface, with 1/4 to 5/16 inch projection, 1-3/4 inch wide face.
- 4. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.
- C. Door: Reinforced for flatness and rigidity. Hinge doors for 180 degree opening with continuous piano hinge. Provide roller type catch.
- D. Door Glazing: Glass, clear, 1/8 inch thick tempered. Set in resilient channel gasket glazing.1. Design: Vertical Duo.
- E. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.
- F. Weld, fill, and grind components smooth.
- G. Finish of Cabinet Exterior Trim and Door: Clear anodized.
- H. Finish of Cabinet Interior: White enamel.

2.4 ACCESSORIES

A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers and accessories in cabinets.

SECTION 10 50 00 - LOCKERS

PART - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Student wardrobe lockers.
 - 2. Staff lockers.
 - 3. Athletic lockers.
 - 4. Locker benches.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker and bench.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work. Show locker fillers, trim, base, and accessories.
 - 1. Include locker-numbering sequence.
 - 2. Locker combinations must be cross referenced with locker numbers; individual lockers must have a minimum of five series of combinations that can be changed by the Owner as necessary. The cross reference information must be submitted in electronic format for the Owner's use.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.
- D. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals specified in Division 1.

1.3 OUALITY ASSURANCE

- A. Source Limitations: Obtain locker units and accessories through one source from a single manufacturer.
- B. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver lockers until spaces to receive them are clean, dry, and ready for locker installation.
- B. Protect lockers from damage during delivery, handling, storage, and installation.

PART - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis-of-Design: Single Point II by Republic Storage Systems Co., Inc.
 - 2. Art Metal Products.
 - 3. List Industries, Inc.
 - 4. Lyon Metal Products, Inc.
 - 5. Penco Products, Inc.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 366/A 366M, matte finish, suitable for exposed applications, and stretcher leveled or roller leveled to stretcher-leveled flatness.
- B. Fasteners: Zinc- or nickel-plated steel, slotless-type exposed bolt heads, and self-locking nuts or lock washers for nuts on moving parts.

2.3 WARDROBE LOCKERS

- A. Body: Form backs, tops, bottoms, sides, and intermediate partitions from steel sheet; flanged for double thickness at back vertical corners. Comply with the following:
 - 1. Back and Side Material Sheet Thickness: 24 gage.
 - a. Where double rows of lockers occur, supply lockers with individual backs placed back-to-back and fastened together.
 - 2. Top and Bottom Material Sheet Thickness: 20 gage.
 - 3. Exposed Ends: Form exposed ends of nonrecessed lockers from minimum 16 gage thick steel sheet.
- B. Frames: Form channel frames from minimum 16 gage thick steel sheet; lapped and welded at corners. Form continuous integral door strike on vertical frame members. Provide resilient bumpers to cushion door closing.
 - 1. Cross Frames: Form intermediate channel cross frames between tiers from minimum 16 gage thick steel sheet. Weld to vertical frame members.
 - 2. Latching shall be achieved by securing an 11 gauge frame hook to the locker side frame located midway up on the door.

C. Doors:

- 1. One-piece steel sheet, formed into double return flanges at vertical edges and flanged at right angles at top and bottom edges. Fabricate to prevent springing when opening or closing, and to swing 180 degrees.
- 2. Comply with the following:
 - a. Sheet Thickness: 14 gage minimum.
 - b. Doors on tiered lockers shall be reinforced with a full height 16 gauge channel reinforcement.
 - c. Concealed Vents: Provide slotted perforations in top and bottom horizontal return flanges of doors. Doors shall be flush design without louvers or perforations.
- D. Shelves: Provide hat shelf in single-tier units; fabricated from minimum 24 gage thick, formed steel sheet; flanged on all edges.
- E. Hinges: Steel, full loop, five or seven knuckle; tight pin; minimum 2 inches high. Weld to inside of door frame and attach to door with at least two factory-installed fasteners that are completely concealed and tamper resistant when door is closed. Provide at least three hinges for each door more than 36 inches high and at least two hinges for each door 36 inches high or less.
- F. Recessed Handle and Latch: Manufacturer's standard housing, formed from 20 gage stainless steel, with integral door pull, recessed for locking devices as follows:
 - 1. At Kitchen, Custodial Staff Lockers, and Student Lockers: Provide single-point II safety latch system with built-in dead bolt combination lock.
 - 2. Doors shall have a catch to retain unlocked doors in the closed position and are to be self latching upon closing.

2.4 ATHLETIC LOCKERS

- A. Body: Form tops and bottoms from minimum 16 gage steel sheet.
 - 1. Solid Backs: Form from minimum 16 gage, solid steel sheet; flanged for double thickness at back vertical corners.
 - 2. Perforated Sides and Intermediate Partitions: Form from minimum 16 gage steel sheet, with manufacturer's standard perforations, rectangular shape.
- B. Frames: Form welded frames from minimum 16 gage, steel sheet channels or minimum 0.1046-inch-thick steel angles.
 - 1. Latch Hooks: Form from minim 11 gage steel; welded or riveted to door frames.
 - 2. Cross Frames: Form intermediate channel cross frames between tiers from minimum 16 gage steel sheet. Weld to vertical frame members.
- C. Doors: Form doors from one-piece steel sheet with flanged edges, complying with the following:
 - 1. Sheet Thickness: 14 gage minimum.
 - 2. Reinforcement: Brace or reinforce inner face of doors more than 15 inches wide.
 - 3. Vents: Provide manufacturer's standard ventilation system.
- D. Shelves: Provide hat shelf in single-tier units; fabricated from minimum 16 gage formed steel sheet; flanged on all edges. Shelves to be mounted approximately 12-inches from locker top.
- E. Hinges: Steel, heavy-duty, full-length, continuous piano type of not less than 16 gage steel. Weld to inside of door frame and mechanically fasten to door. Mechanical fasteners shall be either shake proof screws or manufacturer approved heavy-duty pop-rivets.
- F. Recessed Handle and Latch: Manufacturer's standard housing, formed from 24-gage nickel-plated steel or stainless steel, with integral door pull, recessed for locking devices; and automatic, pre-locking, pry-resistant latch, as follows:
 - 1. Provide minimum single-point latching for each door.

2.5 LOCKER ACCESSORIES

- A. Interior Equipment: Furnish each locker with the following items, unless otherwise indicated:
 - 1. Hooks: Manufacturer's standard zinc-plated, ball-pointed steel. Provide one double-prong ceiling hook, and not fewer than two single-prong wall hooks. Attach hooks with at least two fasteners.
- B. Number Plates: Manufacturer's standard etched, embossed, or stamped, aluminum number plates with numerals at least 3/8 inch high. Number lockers in sequence as directed by the Owner. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
- C. Continuously Sloping Tops: Manufacturer's standard, fabricated from minimum 16 gage thick steel sheet, for installation over lockers with separate flat tops. Fabricate tops in lengths as long as practicable, without visible fasteners at splice locations, finished to match lockers.
- D. Filler Panels: Manufacturer's standard; fabricated from minimum 18 gage thick steel sheet in an unequal leg angle shape, and finished to match lockers. Provide slip joint filler angle formed to receive filler panel.
 - 1. Lockers to be placed in center of available space for locker run with filler panels, of equal widths, at both ends of each locker run when required; a single filler panel at end of each locker run will not be accepted.

E. Boxed End Panels: Manufacturer's standard; fabricated from minimum 16 gage thick steel sheet, with 1-inch-wide edge dimension, finished to match lockers, and designed for concealing exposed ends of nonrecessed lockers.

2.6 FABRICATION

- A. Knock-Down Construction: Fabricate lockers for nominal assembly at Project site.
- B. Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Make exposed metal edges free of sharp edges and burrs, and safe to touch. Weld frame members together to form a rigid, one-piece assembly. Form locker-body panels, doors, shelves and accessories from one-piece steel sheet, unless otherwise indicated.

2.7 ADA COMPLIANT LOCKERS

- A. A minimum of 5 percent of all lockers shall be ADA compliant, with a minimum of 1 ADA locker in each separate area where lockers are installed and shall comply with the following:
 - 1. Forward Reach Requirement: Provide single tier lockers with a hat/hook shelf and coat hooks located not more than 48 inches above finished floor. Provide one additional shelf near the bottom of the locker so that it is not lower than 15 inches above finished floor.
 - 2. Place ADA compliant lockers at least 24 inches away from any wall or other obstacle and provide a minimum clear floor space of 30 by 48 inches with 10-inch minimum for door swing. Provide an area in front of locker within 60-inch-diameter turning circle to allow unobstructed access.
 - 3. Signage: Apply a decal with the international symbol of accessibility to the face of ADA compliant locker doors.

2.8 FINISHES, GENERAL

- A. Finish all steel surfaces and accessories, except prefinished stainless-steel and chrome-plated surfaces.
- B. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond. Use manufacturer's standard methods.
- B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-enamel finish consisting of a thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 1.4 mils on doors and frames, and 1.1 mils elsewhere.
- C. Locker Colors: As selected from manufacturer's standard color range. A maximum of 5 colors will be selected.

2.10 LOCKER BENCHES

- A. Typical Tops: Clear hardwood tops 1-1/4 inches thick.
- B. ADA Compliant Bench: Size to be 1'-8" deep by 3'-6" wide, provide back for bench if not placed against a wall.
- C. Supports: Steel pipe standards spaced not more than 6 feet on center.
- D. Overall Height: 17-3/4 inches.
- E. Finish:
 - 1. Wood: Three coats of polyurethane.
 - 2. Steel: Primer and two coats of enamel; color to match lockers.
- F. Attach each standard to top by screws and anchor to floor by two suitable anchors.

PART - EXECUTION

3.1 INSTALLATION

- A. Install metal lockers and accessories level, plumb, rigid, and flush according to manufacturer's written instructions. Anchor framing consist of 3 horizontal rows of continuous 2 x 4 wood framing behind lockers. Secure to wall with construction adhesive and cut nails.
- B. Anchor lockers to built up bases and walls at intervals recommended by manufacturer, but not more than 36 inches o.c. Install anchors through backup reinforcing plates where necessary to avoid metal distortion, using concealed fasteners. Install lockers in accordance with details indicated on Drawings.
- C. Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates. Attach recess trim to recessed lockers with concealed clips.
- D. Attach boxed end panels with concealed fasteners to conceal exposed ends of nonrecessed lockers.

3.2 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.
- B. Clean interior and exposed exterior surfaces and polish stainless-steel and nonferrous-metal surfaces.
- C. Protect lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit locker use during construction.
- D. Touch up marred finishes to factory-finished appearance, or replace locker units that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

SECTION 10 56 13 - METAL STORAGE SHELVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal storage shelving.
- B. Shelving accessories.

1.2 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Rated uniform shelf loads.
 - 2. Details of shelving assemblies, including reinforcement.
 - 3. Accessories.
- C. Test Reports: Provide independent agency test reports documenting compliance with specified structural requirements.
 - 1. In lieu of test reports, detailed drawings stamped and sealed by a Professional Engineer licensed in the State of Maryland will be acceptable.
- D. Shop Drawings: Indicate location, type, and layout of shelving, including lengths, heights, and aisle layout, and relationship to adjacent construction.
 - 1. Indicate methods of achieving specified anchoring requirements.
- E. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and finishes.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Inspect for dents, scratches, or other damage. Replace damaged units.
- B. Store in manufacturer's unopened packaging until ready for installation.
- C. Store under cover and elevated above grade.

1.4 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Provide one year manufacturer warranty covering defects of manufacturing and workmanship and rust and corrosion

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Four Post Shelving:
 - 1. Hallowell, Div. of List Industries, Inc: www.hallowell-list.com.
 - 2. Penco Products, Inc: www.pencoproducts.com.
 - 3. Lyon Metal Products, Inc.
 - 4. Republic.

2.2 SHELVING - GENERAL

A. See drawings for layout and sizes.

- B. Fabricate all units as initial shelving units with a post at each corner so that units may be moved or relocated by Owner as desired
- C. Shelving: Provide products tested to comply with ANSI MH28.1 for design criteria, lateral stability, shelf connections, and shelf capacity.
- D. Anchors: Provide anchoring hardware to secure each shelving unit to wall.
 - 1. Provide hardware of type recommended by manufacturer for substrate.

2.3 FOUR POST SHELVING

- A. Four Post Shelving: Steel post-and-beam type with sway bracing, shelving brackets, shelving surfaces, and accessories as specified.
 - 1. Unit Width: 36 inches, center to center of posts.
 - 2. Capacity: Minimum 1,200 pound capacity for dead weight evenly distributed over a 36 inches wide x 18 inch deep shelf, including minimum 1.65 safety factor.
 - 3. Shelf Deflection: 1/4 inch in 36 inches, maximum, under rated uniform load.
 - 4. Adjustability of Shelving: At intervals of 1-1/2 inches on center maximum.
 - 5. Shelves per Unit: As indicated on drawings.
 - 6. Finish: Baked enamel, medium gloss.
 - 7. Color: As selected by Architect from manufacturer's standard range.
 - 8. Number of Units: As indicated on drawings.
- B. Posts and Beams: Formed sheet members; perforations may be exposed on face of members.
 - 1. Metal Thickness: 16 gage, 0.0598 inch.
 - 2. Post Face Width: 2 inches, maximum.
 - 3. Connecting Hardware: Manufacturer's standard.
 - 4. Post Bases: Flat steel foot plate, with manufacturer's recommended adjustable leveling device.
- C. Bracing: Formed sheet members.
 - 1. Back Sway Bracing: Either strap or panel; at back of each unit.
 - 2. Side Sway Bracing: Either strap or panel; at each side of each unit.
 - 3. Strap Sway Bracing: One strap installed diagonally, 16 gage, 0.0598 inch; welded, riveted, or bolted to uprights.
 - 4. Panel Sway Bracing: Formed sheet metal panels, 20 gage, 0.0359 inch; welded, riveted, or bolted to uprights.
- D. Shelves: Formed sheet, finished on all surfaces.
 - 1. Metal Thickness: 16 gage, 0.0598 inch.
 - 2. Shelf Edge Profile: Extending 3/4 inch, maximum, below top surface of shelf.
 - 3. Shelf Connection to Posts: Manufacturer's standard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate is level and that clearances are as specified.
- B. Verify that walls are suitable for shelving attachment.
- C. Do not begin installation until substrates have been properly prepared.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor and reinforce as specified, as indicated on drawings, and as recommended by manufacturer.
- C. Install shelving with shelf surfaces level and vertical supports plumb; adjust feet and bases as required.
- D. Out-Of-Square Tolerance Four Post Shelving: Maximum of 1/8 inch difference in distance between bottom shelf and canopy top, measured along any post in any direction.

3.3 PROTECTION

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

SECTION 10 73 10 - PROTECTIVE COVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Engineering design, fabrication and installation of complete welded, extruded aluminum canopies.

1.2 RELATED REQUIREMENTS

A. Section 07 90 05 - Joint Sealants.

1.3 REFERENCE STANDARDS

- A. ASCE 7-95 Minimum Design Loads for Buildings and Other Structures.
- B. AWS D1.1/D1.1M Structural Welding Code Steel.
- C. AWS D1.2 Structural Welding Code Aluminum.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product information, specifications and installation instructions for building components and accessories.
- C. Shop Drawings: Submit detailed drawings, all mechanical joint locations with complete details, connections, jointing and accessories.
- D. Certification: Submit design calculations signed by a Registered Professional Engineer, licensed in the State of Maryland. Design calculations shall state that the protective cover system design complies with the wind requirements of ASCE 7-95, the stability criteria of applicable building code, and all other governing criteria.
- E. Samples for Initial Selection: For each colored or finished component of each type of protective cover indicated.
 - 1. Include similar Samples of accessories involving color selection.
- F. Welding certificates.
- G. LEED Submittals:
 - 1. Credit MR 4.1 and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - a. Contributions to this Credit include recycled content of aluminum.
- H. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Protective cover shall be wholly produced by a recognized manufacturer with at least five years experience in the design and fabrication of extruded aluminum protective cover systems. Components shall be assembled in shop to greatest extent possible to minimize field assembly. Protective cover shall be installed by manufacturer. Third party installation is not acceptable.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code Steel."
 - 2. AWS D1.2, "Structural Welding Code Aluminum."

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of awnings in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Where awning installation is indicated to fit to other work, verify dimensions of other work by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for fenestration operation throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and fabricator agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: 5 years from date of Substantial Completion.
- B. 20-year warranty on finish including checking, crazing, peeling, chalking, fading and/or adhesion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Mapes Industries, Inc.; Super Lumideck Hanger Rod Canopy.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering covers that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Walkway Covers.
 - 2. Dittmer Architectural Aluminum.
 - 3. E. L. Burns Company, Inc.
 - 4. Peachtree Protective Covers.
 - 5. Perfection Architectural Covers, Inc.

2.2 MATERIALS

- A. Aluminum Members: All sections shall be extruded aluminum 6063 alloy, heat treated to T-6 temper.
- B. Fasteners: Fasteners shall be aluminum, 18-8 stainless steel or 300 series stainless steel.
- C. Gaskets: Gaskets shall be dry seal santoprene pressure type.
- D. Sealants: Single component silicone, in color to match sheets and extrusions; refer to Section 07 90 05 Joint Sealants.

2.3 COMPONENTS

A. Beams: Beams shall be open-top tubular extrusion of size and shape shown on drawings, top edges thickened for strength and designed to receive deck members in self-flashing manner. Structural ties shall be installed in tops of all beams.

- B. Deck: Deck shall be extruded self-flashing sections interlocking into a composite unit. Closures at deck ends shall be welded plates.
- C. Hanger Rods: Galvanized/zinc plated; minimum 3/4 inch diameter pipe with attachment hardware.
- D. Fascia:
 - 1. Fascia shall be extruded aluminum; manufacturer's custom 12 inch shape.
 - 2. Provide on all sides of protective cover, including side against exterior wall construction.
- E. Flashing: Flashing shall be 0.040 aluminum (min.). All thru-wall flashing by others.
- F. Accessories: Flashings, brackets and other items necessary for a complete installation.
 - 1. Connect to adjacent downspouts draining into storm drain system, as available to location; perforated drainage at other locations.

2.4 FABRICATION

- A. Bent Construction: Beams shall be factory welded with neatly mitered corners into one-piece rigid bents. All welds shall be smooth and uniform using an inert gas shielded arc. Suitable edge preparation shall be performed to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints shall be used when shipping limitations prohibit the shipment of fully welded bents.
- B. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at 8" O.C. creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Deck shall be assembled with sufficient camber to offset dead load deflection.
- C. Concealed Drainage: Water shall drain from covered surfaces into integral fascia gutter and directed to indicated discharge.
- D. Form exposed field connections with hairline joints, flush and smooth, using concealed fasteners where possible.

2.5 FINISHES

- A. Flouropolymer Finish: AAMA 605.2, two coat; color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight.
 - 1. Match Architect's sample.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for supporting members, inserts, installation tolerances, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Erection:

- 1. Installation to be in strict accordance with manufacturer's shop drawings.
- 2. Protect the finish of components during handling and erection.
- 3. Protective cover shall be erected true to line, level and plumb.

- B. Protective cover components shall be cleaned promptly after installation.
- C. Extreme care shall be taken to protect materials during and after installation.

SECTION 10 7500

FLAGPOLES

PART 1GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aluminum flagpole, ground set.
 - 2. Concrete base.
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section 03 3000 Cast-In-Place Concrete.
 - 3. Section 07 9200 Joint Sealers.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA) 611 Voluntary Specification for Anodized Architectural Aluminum.
- B. ASTM International (ASTM):
 - 1. A312 Standard Specification for Seamless and Austenitic Stainless Steel Pipe.
 - 2. B241 Standard Specification for Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
 - 3. C94 Standard Specification for Ready-Mixed Concrete.
 - 4. E527 Standard Practice for Numbering Metals and Allovs.
- C. National Association of Architectural Metal Manufacturers (NAAMM) AMP 503 Finishes for Stainless Steel.
- D. American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM) FP 100197 Guide Specifications for Design of Metal Flagpoles Manual.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Design flagpole and anchorage devices in accordance with ANSI/NAAMM FP 100197.
 - 2. Minimum loaded design wind speed: 110 MPH with 6-foot x 10-foot foot flag.
- B. Pole Description:
 - 1. Type: Ground set,
 - 2. Pole: Cone tapered.
 - 3. Dimensions:
 - a. Exposed height: 40.
 - b. Overall height: 45' 6".
 - c. Tapered section, length: 32'.
 - d. Butt diameter: 8 inches.
 - e. Wall thickness: 3/16 inch minimum.
 - f. Ball diameter: 8 inches.

- Base Plate: 1/4" thick Stainless steel g.
- Support Plate: 1/4" thick Stainless steel h.

1.4 **SUBMITTALS**

- Submittals for Review: Α.
 - 1. Shop Drawings:
 - Include construction details, material descriptions, dimensions of individual a. components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.
 - 2. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.
- В. Sustainable Design Submittals:
 - Recycled Content.
 - 2. Regional Materials.

QUALITY ASSURANCE 1.5

Installer Qualifications: Minimum 5 years documented experience in work of this Section. A.

DELIVERY, STORAGE AND HANDLING

A. Wrap poles in heavy paper to prevent damage during shipping and handling.

PART 2 **PRODUCTS**

2.1 **MANUFACTURERS**

- Source Limitations: Obtain flagpoles as complete units, including fittings, accessories, bases, and A. anchorage devices, from single source from single manufacture.
- B. Acceptable Manufacturers:
 - 1. American Flagpole, Inc. (www.americanflagpole.com) ss
 - 2. Baartol Co., Inc. (www.baartol.com)
 - 3. Concord Industries, Inc. (www.concordindustries.com)
 - Ewing International Corp. (www.ewingflagpole.com) 4.
 - Pole-Tech Co., Inc. (www.poletech.com) 5.
- C. Substitutions: Under provisions of Division 01.

2.2 **MATERIALS**

- A. Aluminum:
 - ASTM B241, seamless 6063-T6 aluminum alloy.

COMPONENTS 2.3

Pole: Seamless aluminum pipe. A.

B. Fittings:

- 1. Ball: Spun bronze.
- 2. Truck: Revolving, non-fouling, cast aluminum.
- 3. Halyard: Internal type, stainless steel aircraft cable with two stainless steel swivel snap hooks.
- 4. Winch: Internally mounted, with removable crank handle and automatic brake allowing flag to be set at any position.
- 5. Cleat: 9 inch long cast stainless steel.
- 6. Cleat box cover: Hinged cover finished to match flagpole with padlock provisions.
- 7. Collar: Cast aluminum minimum 1 inch larger in diameter than foundation sleeve.
- 8. Foundation sleeve: 16 gage, 10-inch diameter, galvanized, corrugated steel with 3/8 inch base plate.
- 9. Lighting ground rod: Copper, 3/4-inch diameter.
- 10. Lightning ground cable: Copper, No. 6 AWG, soft drawn.
- C. Sleeve for Aluminum Flagpole: Fiberglass or PVC pipe foundation sleeve, made to fit flagpole, for casting into concrete foundation.

2.4 ACCESSORIES

- A. Grout: Cement based, non-shrink.
- B. Joint Sealer: Specified in Section 07 9200.

2.5 FINISHES

- A. Aluminum: AAMA 611, Architectural Class I anodized to 0.0007 inch minimum thickness, clear
- B. Apply bituminous coating to that part of flagpole to be set in base, inside and out.

PART 3 EXECUTION

3.1 PREPARATION

- A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.
- B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.
- C. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.
- D. Sleeves: Locate and secure sleeves in forms by bracing to reinforcement and forms.
- E. Place concrete, as specified in [Section 033053 "Miscellaneous Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for no fewer than seven days or use nonstaining curing compound.

F. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

- A. General: Install flagpoles where indicated and according to manufacturer's written instructions.
- B. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

SECTION 11 00 05 - MISCELLANEOUS EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes equipment not specified in other sections of the Project Manual.
- B. Furnish labor, materials, tools, equipment, services and supervision required to complete Work, including all incidental and complementary Work shown, specified or necessary to complete Work.
- C. Make all final connections for products included in this Section.
- D. Section includes:
 - 1. Kiln.
 - 2. Kiln Ventilator.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate locations, construction and anchorage details, dimensions and rough-in opening sizes.
- B. Product Data: Submit data for furnishings describing size, color and finish, details of function and attachment methods.
- C. Samples:
 - 1. When directed by the Architect, furnish samples showing full color range and other features of the product.
 - 2. Where applicable, furnish one of each type wall clip or anchoring device to install product to the building construction.
- D. Certify in writing that each product meets the specifications and can be installed in building where scheduled; certifications shall be produced and submitted following verification of site conditions.
- E. Submit operation and maintenance data for electrically operated equipment.

1.3 OUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five years experience.

1.4 PROJECT CONDITIONS

- A. Verify measurements in field as required for Work fabricated to fit job conditions.
- B. Before ordering items or fabrication of Work, examine Drawings, job conditions, to assure good fit, neat installation.

PART 2 PRODUCTS

2.1 KILN

- A. Project Standard: km1227-3 by SKUTT; www.skutt.com.
- B. Characteristics:
 - 1. Volume: 9.9 cu/ft.
 - 2. Cone Rating: 8.
 - 3. 208-volts AC, 3phase.
 - 4. Pyrometer and an automatic cut-off device.

- 5. Furniture kit: 2 full shelves, 1 half shelf.
- 6. Five year warranty.

2.2 KILN VENTILATOR

- A. Project Standard: Skutt kiln vent-kiln mount version, model The Envirovent 2.
- B. Coordinate provision of disconnect switch and wiring by Electrical Contractor and hook up of ducting by Mechanical Contractor.

PART 3 EXECUTION

3.1 INSTALLATION

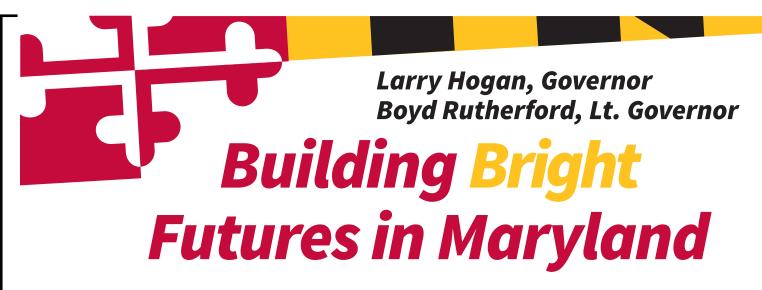
- A. Order items in ample time so as not to delay job progress with delivery at job site coordinated with other Work.
- B. Install in a thorough, workmanlike manner, in strict accordance with manufacturer's printed instructions and subject to inspection by the Architect.

C. Assembly:

- 1. Deliver factory-built units completely assembled in one piece without joints, whenever possible.
- 2. Where dimensions exceed unit size, provide two or more pieces of equal length as acceptable to Architect and Owner.
- 3. When overall dimensions require delivery in separate units, prefit at factory, disassemble for delivery, and make final joints at site.
- 4. Use splines at joints to maintain surface alignment.
- D. Install units in locations and mounting heights as shown on Drawings, keeping perimeter lines straight, plumb and level.
- E. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.
- F. Coordinate job-assembled units with grounds, trim and accessories; join all parts with neat, precision fit.
- G. Verify accessories required for each unit properly installed and operating units properly functioning.

3.2 CLEANUP

A. Remove temporary protective cover at completion.



The State of N	e State of Maryland and the			Board of Education are:	
				the	
	(Select From Page E-1A)				
				SCHOOL	
	(Enter School Name)				
Public School Constr	uction Program	Architect:	(Name of Firm)	Contractor: (Name of Company)	

The Maryland General Assembly

Michael E. Busch, Speaker of the House Thomas V. Mike Miller, Jr., President of the Senate

Board of Public Works

Larry Hogan, Governor Peter Franchot, Comptroller Nancy K. Kopp, Treasurer

SECTION 11 31 00 - APPLIANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Appliances.

1.2 REFERENCE STANDARDS

A. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.3 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.
- C. LEED submittal: Process water usage for all equipment that uses water and Energy Star documentation where specified.
- D. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Electric Appliances: Listed and labeled by UL and complying with NEMA standards.

1.5 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.
- C. Provide ten (10) year manufacturer warranty on magnetron tube of microwave ovens.
- D. Provide ten (10) year manufacturer warranty on tub and door liner of dishwashers.

PART 2 PRODUCTS

2.1 APPLIANCES

A. The design for each appliance is based on products indicated on the Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify utility rough-ins are provided and correctly located.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor built-in equipment in place.

3.3 ADJUSTING

A. Adjust equipment to provide efficient operation.

3.4 CLEANING

A. Remove packing materials from equipment and properly discard.

B. Wash and clean equipment.

END OF SECTION

SECTION 114000 - FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Fabricated equipment.
- 2. Food waste machines.
- 3. Cooking equipment.
- 4. Self-contained refrigeration equipment.
- 5. Walk-in refrigeration equipment.
- 6. Powered food-preparation equipment.
- 7. Warewashing equipment.
- 8. Serving equipment.
- B. Owner-Furnished Equipment: Where indicated, Owner will furnish equipment for installation by Contractor

C. Related Sections:

- 1. Division 21, 22, and 23 Sections for supply and exhaust fans; exhaust ductwork; service roughing-ins; drain traps; atmospheric vents; valves, pipes, and fittings; fire-extinguishing systems; and other materials required to complete foodservice equipment installation.
- 2. Division 23 Section "Commercial-Kitchen Hoods" for ventilation hoods.
- 3. Division 26 Sections for connections to fire-alarm systems, wiring, disconnect switches, and other electrical materials required to complete foodservice equipment installation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Manufacturer's model number.
 - 2. Accessories and components that will be included for Project.
 - 3. Clearance requirements for access and maintenance.
 - 4. Utility service connections for water, drainage, power, and fuel; include roughing-in dimensions.

- B. Shop Drawings: For fabricated equipment. Include plans, elevations, sections, roughing-in dimensions, fabrication details, utility service requirements, and attachments to other work.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each factory-applied color finish required, in manufacturer's standard sizes.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For foodservice facilities.
 - 1. Indicate locations of foodservice equipment and connections to utilities.
 - 2. Key equipment using same designations as indicated on Drawings.
 - 3. Include plans and elevations; clearance requirements for equipment access and maintenance; details of equipment supports; and utility service characteristics.
 - 4. Include details of seismic bracing for equipment.
- B. Warranty: Samples of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For foodservice equipment to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section, include the following:
 - 1. Product Schedule: For each foodservice equipment item, include the following:
 - a. Designation indicated on Drawings.
 - b. Manufacturer's name and model number.
 - c. List of factory-authorized service agencies including addresses and telephone numbers.

1.6 QUALITY ASSURANCE

- A. NSF Standards: Provide equipment that bears NSF Certification Mark or UL Classification Mark certifying compliance with applicable NSF standards.
- B. N/A
- C. UL Certification: Provide electric and fuel-burning equipment and components that are evaluated by UL for fire, electric shock, and casualty hazards according to applicable safety standards, and that are UL certified for compliance and labeled for intended use.
- D. Steam Equipment: Provide steam-generating and direct-steam heating equipment that is fabricated and labeled to comply with ASME Boiler and Pressure Vessel Code.

- E. Regulatory Requirements: Install equipment to comply with the following:
 - 1. ASHRAE 15, "Safety Code for Mechanical Refrigeration."
 - 2. NFPA 54, "National Fuel Gas Code."
 - 3. NFPA 70, "National Electrical Code."
 - 4. NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations."
- F. Seismic Restraints: Comply with SMACNA's "Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines," Appendix A, "Seismic Restraint Details," unless otherwise indicated.
- G. Preinstallation Conference: Conduct conference as indicated in Division 1.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of construction contiguous with foodservice equipment by field measurements before fabrication. Indicate measurements on Coordination Drawings.

1.8 COORDINATION

- A. Coordinate foodservice equipment layout and installation with other work, including layout and installation of lighting fixtures, HVAC equipment, and fire-suppression system components.
- B. Coordinate locations and requirements of utility service connections.
- C. Coordinate sizes, locations, and requirements of the following:
 - 1. Overhead equipment supports.
 - 2. Equipment bases.
 - 3. Floor depressions.
 - 4. Insulated floors.
 - 5. Floor areas with positive slopes to drains.
 - 6. Floor sinks and drains serving foodservice equipment.
 - 7. Equipment supports, and penetrations.

1.9 WARRANTY

- A. Refrigeration Compressor Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace compressors that fail in materials or workmanship within specified warranty period.
 - 1. Failure includes, but is not limited to, inability to maintain set temperature.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EQUIPMENT

ITEM #1 WORK TABLE

Quantity: One (1)
Manufacturer: John Boos

Model: ST4R5-2460SBK

ALT. MFG. #1 Advance

ALT. MFG. #2 Fabricator/Custom

Features:

- Model ST4R5-2460SBK Work Table, 60"W x 24"D, 14/300 stainless steel top with 5" backsplash & turndown, Stallion safety edge front, 90° turndown on sides, stainless steel legs and feet, side & rear adjustable bracing, NSF, fully welded, sound deadening under-coating, 14 gauge s/s undershelf with rear and ends turned up.
- Edlund Model G-2 Can Opener, manual, 16" welded stainless steel shaft, melonite arbor, with standard length bar and plated base, NSF certified
- Fully welded
- Shop drawing required

ITEM #2 EXHAUST HOOD

Quantity: One (1) Manufacturer: Halton

Model: KVEWWUV
ALT. MFG. #1 Captive aire
ALT. MFG. #2 Gaylord

Remarks:

- See Halton drawing C1269
- See HFS Details 5.70 & 6.01

- Two sections, 90" L x 66"W x 24"H
- Fully welded 300 series s/s
- One (1) LED light in each section
- Manual balancing damper
- Pre-piped Ansul system in plenum and drops
- Wash timer panel
- UV control panel
- Utility cabinet to house fire suppression system on left end
- S/s enclosure panels to ceiling
- All s/s or chrome plated piping for exposed drain to floor sink
- Supply plenum
- Automatic water wash system
- Manifold drain from right section to left section; s/s vertical pipe drop to grease trap via floor sink
- Factory commissioning

- Gas valve shutoff valve
- Remote pull station
- S/s Ansul drops
- S/s wall panel and gasket per HFS Detail 6.10

- Shop drawing required

ITEM #3 HOOD CONTROL PANEL

Quantity: One (1)
Manufacturer: Halton
Model: CUSTOM
ALT. MFG. #1 Captive aire
ALT. MFG. #2 Gaylord

Remarks:

- Timer, fan and UV control panel included in item #2
- Detergent reservoirShop drawing required

FIRE SUPPRESSION SYSTEM

Quantity: One (1)

Manufacturer: Ansul Fire Protection

Model: Pirhana
ALT. MFG. #1 Amerex
ALT. MFG. #2 Gaylord

Remarks:

ITEM #4

- Pre-piped plenum, Ansul system, control panel and drops included in item #2

Features:

- Connection to building fire panel by Fire Suppression Engineer.
- Shunt trip breakers in electrical panel by Electrical Engineer.
- Fire Marshal approved shop drawing required

ITEM #5 CONVECTION OVEN

Quantity: One (1)

Manufacturer: Duke Manufacturing

Model: 613-G2V ALT. MFG. #1 Vulcan ALT. MFG. #2 Blodgett

- Model 613-G2V Convection Oven, gas, double-deck, standard depth, with 8" stainless steel legs & adjustable stainless steel feet, feet, 65/35 stainless steel dependent doors, solid doors in lieu of window, (6) racks, (13) rack positions, porcelain interior, mech. snap action thermostat (200°-500°F), 60 minute dial timer with buzzer & (2) speed fan, ENERGY STAR®
- Manifold piping of natural gas with AGA NSF approved 60" quick disconnect with swivels and restraint device.
- Posi-set caster.
- Finished back

- Cord & plug, per deck
- Advance worktable VKS-302 CUSTOM, 24" L x 30" W x 30"H, 10" backsplash, 18-guage undershelf, 14-guage top, fully welded
- Confirm if water connection is required

- Shop drawing required

ITEM #6 INDUCTION RANGE W/ TABLE

Quantity: One (1)

Manufacturer: Garland/US Range Model: SHDUBA7000 ALT. MFG. #1 Electrolux ALT. MFG. #2 Indux

Features:

- Model SHDUBA7000 Induction Dual Base-Line Cook Top, countertop, (2) burners, 12.6" x 22.8" ceran ceramic glass top, rotary controlled, (12) power level settings, removable grease filter, stainless steel construction, 6 ft cord, ETL, cETLus, CE, FCC
- Advance Tabco TFMSU-18016 gauge 18" L x 30" W x 30" H 304 s/s work table, 6"H closed backsplash, s/s undershelf with rear and ends turned up 2", s/s legs and flanged feet
- Shop drawing required

ITEM #7 TILTING SKILLET, GAS

Quantity: One (1)

Manufacturer: Cleveland Range

Model: SGL30T1 ALT. MFG. #1 Vulcan ALT. MFG. #2 Groen

Features:

- Model SGL30T1 PowerPan[™] Tilting Skillet, gas, 30-gallon capacity, bead blasted cooking surface, 10° tilt cooking feature, with easy manual hand tilt, spring-assisted cover with vent, gallon & liter markings, food strainer, stainless steel construction with open leg frame, CE, NSF, 125,000 BTU
- 48" AGA NSF flexible natural gas connector
- Electric Pan Tilt
- Pan Carrier
- Coordinate location with pour path for item #11 trough

ITEM #8 POT / KETTLE FILLER FAUCET

Quantity: One (1)
Manufacturer: T&S Brass
Model: B-0598
ALT. MFG. #1 Fisher
ALT. MFG. #2 Chicago

- Model B-0598 Pot Filler Faucet, splash mount, 8" centers, double-jointed, 24"L, with insulated off-on control valve at outlet, 1/2" IPS female inlet

ITEM #9 S/S WALL PANEL WITH GASKET

Quantity: One (1)

Manufacturer: FABRICATOR Model: CUSTOM ALT, MFG. #1 N/A

ALT. MFG. #1 N/A ALT. MFG. #2 N/A

Remarks:

See HFS Detail 6.10Shop drawing required

ITEM #10 SPARE NO.

ITEM #11 FLOOR TROUGH

Quantity: One (1)
Manufacturer: Eagle Group
Model: ASFT-1830-SG
ALT. MFG. #1
IMC/Teddy
ALT. MFG. #2
Advance

Remarks:

Waste to grease trap

Features:

- Model ASFT-1830-SG Anti-Splash Floor Trough, 30"W x 18"D, stainless steel subway-style grating with anti-slip main bars perpendicular to pour path of item #7, 6" deep anti-splash trough pan with built-in pitch toward drain, accommodates up to a 4" diameter drain pipe, includes removable perforated basket, all-welded 14/304 stainless steel construction
- Orient grating per planShop drawing required

ITEM #12 COMBI OVEN W/ STAND

Quantity: One (1)
Manufacturer: Convotherm
Model: C4 ED 6.10EB
ALT. MFG. #1 Altoshaam
ALT. MFG. #2 Eletrolux

Remarks:

- Waste to grease trap via floor sink

Features:

- Model C4 ED 6.10EB Convotherm Combi Oven/Steamer, electric, steam generator, (7) half size sheet pan or (7) 12" x 20" x 1" hotel pan capacity, easyDial control panel with digital display 9-stage & 99 cooking recipes storage, (4) cooking modes: hot air, steam, combi-steam & retherm, multi-

point core temperature probe, five-speed auto reversing fan, anti-microbial hygienic door handle, pull-out spray hose, stainless steel construction

- 208/9/25.0/standard
- Door hinged right, standard, disappearing door option
- S/s 30" H stand
- Convo clean, fully automatic cleaning
- NSF flexible water connectors
- A water analysis is required for the proper selection of a water treatment system.

ITEM #12.1 WATER FILTER

Ouantity: One (1) Manufacturer: Everpure Model: CB20-124E

Remarks:

Serves #12 COMBI-OVEN

ITEM #13 **WORK TABLE**

Ouantity: Five (5)

Manufacturer: Advance Tabco

Model: TKSS-305/KSS-306 CUSTOM

ALT. MFG. #1 Fabricator/Custom

ALT. MFG. #2 Eagle

Features:

- Three (3) units 60" L with open base and one (1) unit 72" long with s/s
- Model TKSS-305 Work Table, 30" wide top, with splash at rear only, with stainless steel legs and feet, side & rear stainless steel crossrails on two units and 14-gauge s/s undershelf with rear and ends turned up 2", 14 gauge 304 series stainless steel top, 5" backsplash, stainless steel bullet feet
- Model TA-25 Casters, 5", swivel, with polyurethane wheels (set of 4) (2 with brakes)
- 12" W two tier s/s self-supporting overshelf
- Fully welded
- Shop drawing required

ITEM #14 MOBILE HOT FOOD HOLDING CABINET

Ouantity: Two (2) Manufacturer: Metro

C599-SDS-U Model:

ALT. MFG. #1 Duke ALT. MFG. #2 Cress-Cor

Features:

Model C599-SDS-U C5™ 9 Series Controlled Humidity Heated Holding & Proofing Cabinet, mobile, full height, insulated solid Dutch doors, universal wire slides, capacity (17) 18" x 26" or (34) 12" x 20" x 2-1/2" pans, 3" O.C.

(adjustable on 1-1/2" increments), stainless steel, 5" casters, polymer bumper & drip trough combination, cULus, NSF, ENERGY STAR®

ITEM #15 CEILING HUNG CORD REEL

Quantity: Four (4) Manufacturer: Murrell

Model: HBL45123TL20

ALT. MFG. #1 N/A ALT. MFG. #2 N/A

Remarks:

- See Electrical Division

- Caps to be flat with ground for 20 amp dedicated circuit

- See plan for location

ITEM #16 HAND SINK
Quantity: Four (4)
Manufacturer: Advance Tabco

Manufacturer: Advance Tabco Model: 7-PS-62 CUSTOM

ALT. MFG. #1 Eagle ALT. MFG. #2 Glastender

Features:

- Model 7-PS-62 Hand Sink, wall model, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 series stainless steel, splash mounted gooseneck faucet, knee valve, Fisher #651-2400 cross hair waste socket in lieu of basket drain, wall bracket, NSF, cCSAus
- Note: This faucet complies with 2014 Federal no lead standards
- Model K-08 Low-flow aerator 0.5gpm, fits 55/64-27 male or 15/16-27 female thread on spout, conforms to California AB 1953
- Turn single thickness splash on left and right for two (2) units

- Shop drawing required

ITEM #17 TWO (2) COMPARTMENT SINK

Quantity: One (1)

Manufacturer: AERO Manufacturing Model: 3F2-2116-24LR CUSTOM

ALT. MFG. #1 Advance

ALT. MFG. #2 Fabricator/Custom

Features:

- Model 3F2-2116-24LR Delux™ Sink, two compartment, 83"W x 27"D x 39-1/2"H, 16/304 stainless steel construction, (2) 16" wide x 21" front-to-back x 16" deep fabricated compartments, 24" drainboards on left & right, 10" H closed backsplash, 8" O.C. splash mount faucet holes, raised rolled edges on front & sides, fully welded stainless steel gussets, 16/304 stainless steel legs

with adjustable stainless steel feet, Aero Hemmed Safety Edge™, KD, NSF, front apron panel

- Fisher Model 2267 Pot Filler Faucet, splash mount, 8" centers, double-jointed, 20"L, with insulated off-on control valve at outlet, 3/4" IPS female inlet
- Shop drawing required

ITEM #18 WALL GRID STORAGE SHELVING

Quantity: Two (2)
Manufacturer: Metro
Model: SWK36-1
ALT. MFG. #1 Eagle
ALT. MFG. #2 Amco

Features:

- Model SWK36-1 SmartWall G3 Medium Duty Task Station Starter Unit, consists of (1) SW40K3 wall track (2) SWU30K3 uprights (2) SWS18K3 shelf supports (1) 1836NK3 wire shelf, & (1) WG1836K3 wire grid

ITEM #19 SPARE NO.

ITEM #20 SPARE NO.

ITEM #21 HOT FOOD SERVING COUNTER

Quantity: Two (2) Manufacturer: Delfield

Model: DC-H4-CUSTOM

ALT. MFG. #1 Shelley ALT. MFG. #2 Duke

Features:

- Model DC-H4 ConceptsTM Heated Serving Counter, Electric, 66" length, (4) 12" x 20" pan capacity, infinite temperature controls, stainless steel top & heated food well, exposed end, front and rear removable panels, 1/2" drains, wet & dry operation, 6" legs, cUL, UL, NSF, bullet locking alignment to adjacent counter, fixed food guard with 1" brushed s/s posts and Starphire glass and LED lights and independent heat lamp with switches and controls in apron. UL and NSF listed.
- Autofill
- Panel color to be selected by Architect
- Shop drawing required

ITEM #22 MILK COOLER

Quantity: Two (2)

Manufacturer: Piper Products/Servolift Eastern

Model: MILK-8

ALT. MFG. #1 ALT. MFG. #2 Alamo Beverage Air

Features:

- Model MILK-8 Reflections Milk Cooler, 60"L x 36"H, modular mobile design, (400) 1/2 pint carton capacity, stainless steel top, fiberglass unit, fully insulated, UL, NSF
- Color to be selected by Architect

ITEM #23 COLD PAN SERVING COUNTER

Quantity: Two (2) Manufacturer: Delfield

Model: DC-MC4 CUSTOM

ALT. MFG. #1 ALT. MFG. #2 Shelley Duke

Features:

- Model DC-MC4 Concepts[™] Mechanically Cooled Serving Counter, (4) 12" x 20" pan capacity, stainless steel top, exposed end, front & rear removable panels, bullet locking alignment to adjacent counter, thermostat for temperature control, fixed food guard with 1" brushed s/s posts and Starphire glass and LED lights with switches and controls in apron, integral V-stamp pan rest, open base, 1" drain, 6" legs, refrigerant, cUL, UL, NSF, 1/4 hp
- NSF, UL Listed
- Extended top and base; dimensions per plan
- Panel color to be selected by Architect
- Shop drawing required

ITEM #24 UTILITY COUNTER W/ FROST TOP AND DOUBLE SIDED DISPLAY AND

CASHIER COUNTER WITH TWIN TRAY SLIDE

Quantity: One (1)
Manufacturer: Delfield

Model: SCFT-50-NU CUSTOM

ALT. MFG. #1 Shelley ALT. MFG. #2 Duke

- Model SCFT-50-NU ShelleysteelTM Frost Top Serving Counter, dimensions per plan, stainless steel frost top elevated 1-5/8" above counter top, perimeter trough with drain, stainless steel enclosed base, 5" swivel casters, fixed food guard with 1" brushed s/s posts and Starphire glass and LED lights with switches and controls in apron, self-contained refrigeration with RcUL, UL, NSF, 1/4 hp
- Food Shield, double self-service, fully adjustable, tempered glass top shelf & 10" wide sneeze guards, 1" diameter stainless steel tubing double supports, NSF, UL Listed
- Single cashier station with foot rest integrated into end of frost top section, with controls in apron between #23
- Shop drawing required

MOBILE TRASH CAN AND DOLLY ITEM #26

Ouantity: Two (2) Rubbermaid Manufacturer: FG353600GRAY Model:

ALT. MFG. #1 ALT. MFG. #2 Features:

> Model FG353600GRAY Square BRUTE® Container, without lid, 40 gallon, 23-1/2"D x 28-3/4"H, nesting handles, rounded corners & smooth contours, plastic construction, gray, with top.

Model FG353000BLA Square BRUTE® Dolly, 17-1/4"D x 6-1/4"H, for 3526 and 3536 containers, 250 lb. capacity, black

ITEM #27 MOBILE RECYCLE BIN

Quantity: Two (2) Manufacturer: Rubbermaid Model: FG353600GRAY

ALT. MFG. #1 ALT. MFG. #2 Features:

> Model FG353600GRAY Square BRUTE® Container, without lid, 40 gallon, 23-1/2"D x 28-3/4"H, nesting handles, rounded corners & smooth contours, plastic construction, gray, top

Model FG353000BLA Square BRUTE® Dolly, 17-1/4"D x 6-1/4"H, for 3526 and 3536 containers, 250 lb. capacity, black

ITEM #28 MOBILE TRAY & FLATWARE DISPENSER

Quantity: Two (2) Manufacturer: Vollrath

99305 CUSTOM Model:

ALT. MFG. #1 Delfield ALT. MFG. #2 Servolift

Features:

Model 99305 Signature Server® with Stainless Steel Countertops, Tray & Flatware Cart, stainless steel finish, entire unit construction of type 304 stainless, polished to #4 finish or equal, cutouts in top shelf for 12 flatware containers (containers included with unit), protective rubber bumpers on all corners of tray shelf, entire unit riveted construction, 4" heavy-duty ballbearing swivel casters, polyurethane tread wheels, hold up to 160 trays & 475 pieces of flatware, 22-1/2"Lx38"Wx34"H, optional laminate finishes can be applied over all-stainless unit, NSF, Made in USA

All stainless, standard

SPARE NO. ITEM #29

ITEM #30 SPARE NO.

ITEM #31 MOBILE CASHIER STATION WITH TWIN TRAY SLIDES

Quantity: One (1)
Manufacturer: Delfield
Model: CUSTOM
ALT. MFG. #1 Shelley
ALT. MFG. #2 Duke

Features:

- Mobile cashier station, dimensions per plan, with foot rest and dual fold

down tray slide

- Shop drawing required

ITEM #32 FLOOR POWER AND DATA OUTLET

Quantity: One (1)

Remarks:

- By electrical division

ITEM #33 CASH REGISTER AND CARD SCANNER

Quantity: Two (2)

Remarks:

- By owner

- Data and power via Item #32

ITEM #34 WALK-IN COOLER/FREEZER

Quantity: One (1)

Manufacturer: Master-Bilt Products

Model: CUSTOM ALT. MFG. #1 Bally ALT. MFG. #2 Norlake

Remarks:

Refer to Master-Bilt drawing #MB1641628DC-B

Features:

- 23'-4" L x 10'-1" W x 8'-6" H

- Recessed unit in 5" depression with 1" self-leveling compound

- Provide cooler/freezer with wearing surface of Protect-All Dark Grey recycled vinyl flooring with 6" coved base and edge reducer and install by MFG authorized and trained installer. Protect-All 800-544-9538

- Two (2) 36" W hinged doors with three hinges; shift cooler door up for depression

- Two (2) 4" dial thermometer over walk-in door for cooler and freezer
- MBWA-1 digital thermometer with contact for BMS
- Two peep windows, heated on freezer

- Minimum two LED lights per compartment to achieve minimum 50 foot candles at floor level
- Secureguard latch on exterior, 3 hinges per door, K-1094 door closure, 48"H diamond aluminum kick plate on exposed exterior, door jambs and interior door faces.
- Shop drawing required

ITEM #35 EVAPORATOR, 34'F

Quantity: One (1)

Manufacturer: Master-Bilt Products

Model: E1HZ0130A

ALT. MFG. #1 Bally ALT. MFG. #2 Norlake

Remarks:

- Refer to Master-Bilt drawing #MB1641628DC-B

ITEM #36 CONDENSER, 34'F

Quantity: One (1)

Manufacturer: Master-Bilt Products
Model: SHHZ015WC

ALT. MFG. #1 Bally ALT. MFG. #2 Norlake

Remarks:

Refer to Master-Bilt drawing #MB1641628DC-B

Features:

- Water cooled 208/60/3
- Ceiling supported equipment stand
- Reverse cycle defrost

- Upgrade for new refrigerant if installed after 2017

ITEM #37 EVAPORATOR, -10'F

Quantity: One (1)

Manufacturer: Master-Bilt Products

Model: E1LZ0075B

ALT. MFG. #1 Bally ALT. MFG. #2 Norlake

Features:

Reverse cycle frost

ITEM #38 CONDENSER, -10'F

Quantity: One (1)

Manufacturer: Master-Bilt Products

Model: SHLZ020WC

ALT. MFG. #1 Bally ALT. MFG. #2 Norlake Features:

- Water cooled 208/60/3

- Ceiling supported equipment stand

- Reverse cycle defrost

- Upgrade for new refrigerant if installed after 2017

ITEM #39 SPARE NO.

ITEM #40 SPARE NO.

ITEM #41 MOBILE WALK-IN SHELVING

Quantity: Seven (7)
Manufacturer: Metro
Model: MQ2148G
ALT. MFG. #1 Eagle
ALT. MFG. #2 Amco

Features:

- Eight units, each with:

- Four (4) Model MQ2148Q plastic shelves, wire, 48"W x 21"D, epoxy stainless steel finish, plastic split sleeves are included in each carton, NSF
- Four (4) Model 27UPS Super Erecta® Post, 28-1/2"H, for use with stem casters, stainless finish
- Four (4) Model 4LD Super Erecta® Stem Caster, swivel, 4"D wheel, 1/2" face, polyurethane wheel tread, 125 lb. capacity

ITEM #42 MOBILE PAN RACK

Quantity: Two (2)

Manufacturer: Advance Tabco

Model: NR-20 ALT. MFG. #1 Cress-Cor ALT. MFG. #2 Lakeside

Features:

- Model NR-20 Rack, mobile pan, full height, nesting design, open sides, with angle tray guides on 3" centers, capacity 20 - 18" x 26" sheet pans or 40 - half-size pans, all-welded aluminum construction, front loading, 69-1/2" high

ITEM #43 WIRE SHELVING

Quantity: Four (4)
Manufacturer: Metro
Model: 2448NS
ALT. MFG. #1 Eagle
ALT. MFG. #2 Amco

- Four (4) units, each with:
- Four (4) Model 2448NS Super Erecta® Shelf, wire, 48"W x 24"D, stainless steel finish, plastic split sleeves are included in each carton, NSF
- Four (4) Model 27UPS Super Erecta® Post, 28-1/2"H, for use with stem casters, stainless finish
- Four (4) Model 4LD Super Erecta® Stem Caster, swivel, 4"D wheel, 1/2" face, resilient rubber wheel tread, 125 lb. capacity

ITEM #44 DRY STORAGE DUNNAGE RACK

Quantity: Four (4)
Manufacturer: John Boos
Model: JB04
ALT. MFG. #1 AMCO
ALT. MFG. #2 IMC/Teddy

Features:

- Model JB04 Dunnage Rack, 1-tier, 24" W x 34" L x 12" H, stainless steel tubular construction & bullet feet, all welded set up

ITEM #45 SPARE NO.

ITEM #46 LOCKERS
Quantity: One (1)
Manufacturer: Global
Model: Paramount

ALT. MFG. #1 ALT. MFG. #2 Remarks:

- Three units of double tier lockers, with sloping tops

ITEM #47 SOILED DISH TABLE W/ PRE-RINSE SINK

Quantity: One (1)

Manufacturer: AERO Manufacturing Model: 3SD-L-84 CUSTOM

ALT. MFG. #1 Penco ALT. MFG. #2 Update

Remarks:

- See HFS Detail 6.02

Features:

- Model 3SD-L-60 Delux[™] Soiled Dishtable, straight design, length per plan x 30"D x 40"H, left-to-right operation, 16/304 stainless steel top, 7"H backsplash with 2" sanitary return, 8" O.C. splash mount faucet holes, 20" wide x 20" front-to-back x 5" deep fabricated pre-rinse sink with basket drain, fully welded stainless steel gussets, 16/304 stainless steel legs & side cross bracing, adjustable s/s feet, Aero Hemmed Safety Edge[™], fully welded, NSF

- Superior Manufacturing RT-750 water conditioner installed on hot water supply per manufacturers clearance requirements
- Water quality submittal required
- T&S Brass Model B-0133-EE-CR-8C Pre-Rinse Unit, 8" c/c wall mount, 1/2"NPT 00EE Male Inlets, B-0108-C spray valve, ceramic cartridge
- Scupper drain prior to opening of dishwasher
- Interface for #53 Warewasher
- Under-counter tubular racking storage shelf
- Scrap block in location per plan
- Interface for ITEM #64
- Custom s/s pass window and frame

- Shop drawing required

ITEM #48 SPARE NO.

ITEM #49 SPARE NO.

ITEM #50 GLASS RACK OVERSHELF

Quantity: One (1)

Manufacturer: Advance Tabco
Model: DT-6R-13-CUSTOM
ALT. MFG. #1 Fabricator/Custom

ALT. MFG. #2 Eagle

Features:

- Model DT-6R-13 Sorting Shelf, traditional design, 48" +/- W, accommodates
 (2) full size dish racks, stainless steel, NSF, to span ITEM #64 TRAY
 RETURN WINDOW
- Shop drawing required

ITEM #51 MOBILE SOAK SINK

Quantity: One (1)
Manufacturer: John Boos

Model: PB-SOSINK18-20H

ALT. MFG. #1 Advance ALT. MFG. #2 Eagle

Features:

- Model PB-SOSINK18-20H Soak Sink, mobile, 20" working height, 18" x 18" x 8" deep fabricated sink compartment, no drip edge, twist lever waste, 16/304 stainless steel construction, 5" swivel casters, NSF

ITEM #52 DISHWASHER, DOOR TYPE

Quantity: One (1)
Manufacturer: Hobart

Model: ADVANSYS PW10ER-1

ALT. MFG. #1 ALT. MFG. #2 Electrolux Champion

Features:

- Model ADVANSYS Dishwasher, hood type, (40) racks/hour, hot water sanitizing with built-in booster heater, corner mounted electronic controls with built-in programming, automatic self-cleaning cycle, detergent & rinse aid pumps, 304 stainless steel construction, adjustable feet, 2 HP, heat, UL, NSF Sanitation, ENERGY STAR®
- Single point electrical connection
- Tall wash chamber
- Drain tempering kit

ITEM #53 CONDENSATE HOOD

Quantity: One (1)
Manufacturer: John Boos

Model: C2H-36-2-CUSTOM

ALT. MFG. #1 Captive aire ALT. MFG. #2 Gaylord

Features:

- Model C2H-36-2 Condensate Hood, 36"W x 36"D x 19"H, full perimeter gutter with drain, 10" x 10" exhaust duct collar, 600 CFM, 3/8" dia. x 2" rear drain tube, welded hanging brackets, 18/300 series stainless steel construction
- Coordinate clearance for ITEM #52 DISHWASHER

ITEM #54 CLEAN DISHTABLE

Quantity: One (1)

Manufacturer: AERO Manufacturing Model: 3CD-R-84 CUSTOM

ALT. MFG. #1 Advance

ALT. MFG. #2 Fabricator/Custom

Features:

- Model 3CD-R-84 Delux[™] Clean Dishtable, straight design, length per plan x 30"D x 40"H, left-to-right operation, 16/304 stainless steel top, 7"H backsplash with 2" sanitary return on rear, raised rolled edges on front & right side, fully welded stainless steel gussets, 16/304 stainless steel legs & adjustable crossbracing with tubular rack storage shelf, adjustable stainless steel feet, Aero Hemmed Safety Edge[™], fully welded, NSF
- 3" gap between table and #56
- Interface for #53 Warewasher
- Shop drawing required

ITEM #55 MOBILE POT/PAN SHELVING

Quantity: One (1)
Manufacturer: Metro
Model: 2448NS

ALT. MFG. #1 ALT. MFG. #2 Amco Eagle

Features:

- Four (4) Model 2448NS Super Erecta® Shelf, wire, 48"W x 24"D, stainless steel finish, plastic split sleeves are included in each carton, NSF
- Four (4) Model 27UPS Super Erecta® Post, 28-1/2"H, for use with stem casters, stainless finish
- Four (4) Model 4LD Super Erecta® Stem Caster, swivel, 4"D wheel, 1/2" face, polyurethane wheel tread, 125 lb. capacity

ITEM #56 THREE (3) COMPARTMENT SINK

Quantity: One (1)
Manufacturer: John Boos

Model: 3PB184-2D18-CUSTOM

ALT. MFG. #1 Advance

ALT. MFG. #2 Fabricator/Custom

Features:

- Model 3PB184-2D18 Pro-Bowl Sink, (3) 30"W x 24" front-to-back x 14" deep compartments, (2) 18" drainboards, 10"H boxed backsplash with 45° top & 2" return on rear and closed on right end, (2) sets faucet holes, 16/300 stainless steel, 1-5/8" OD stainless steel legs with 1-1/4" OD adjustable side & front bracing, fully welded front apron & adjustable stainless steel feet, NSF
- Three (3) Fisher Waste King drains #80756 with overflows, with alternate handle installed
- Two (2) Fisher Model 2267 Pot Filler Faucet, splash mount, 8" centers, double-jointed, 20"L, with insulated off-on control valve at outlet, 3/4" IPS female inlet
- Shop drawing required

ITEM #61 MOP SINK
Quantity: One (1)
Manufacturer: IMC TEDDY

Model: DL-2 ALT. MFG. #1 Eagle

ALT. MFG. #2 Fabricator/Custom

Features:

- Utensil Can Washer Sink, floor mounted, 26" W x 28" D x 3' H (overall),
 26" W x 28" front-to-back x 12" deep (bowl size), free flow drain with 2" IPS outlet, stainless steel construction
- Service Faucet and rinse spray hose
- S/s wall panels on two sides by Fabricator, 50" H
- Mop Hanger installed over Mop Sink at right angle to the faucet
- Faucet with garden hose thread for ITEM #68 PRESSURE WASHER

ITEM #62 CHEMICAL STORAGE SHELVING

Quantity: One (1)
Manufacturer: METRO
Model: 2448NS
ALT. MFG. #1 Amco
ALT. MFG. #2 Eagle

Features:

- Four tier shelving unit with stainless steel posts

- Polyurethane casters

ITEM #63 AIR CURTAIN

Quantity: One (1)
Manufacturer: Berner

Model: SLC07-1036A

ALT. MFG. #1 Curtron ALT. MFG. #2 Aleco

Features:

- Model SLC07-1036A Sanitation Series Low Profile Air Curtain, 36"L, unheated, (1) 1/5 hp motor, for doors up to 7' high, aluminized steel cabinet, baked-on electrostatic white powdered coated aluminum steel cabinet, interior or exterior mounting, UL listed, EPH listed for NSF 37

- White powder coat exterior finish standard

ITEM #64 TRAY RETURN WINDOW

Quantity: One (1)

Manufacturer: AERO Manufacturing

Model: CUSTOM

ALT. MFG. #1 Fabricator/Custom ALT. MFG. #2 Advance/Custom

Remarks:

- See HFS Detail 6.02

- Integrated with item #47 Soiled Dish Table

- Shop drawing required

Features:

- 4'-0" L x 14" H

ITEM #65 NON-MOBILE FILLER SECTION

Quantity: One (1)
Manufacturer: Delfield
Model: CUSTOM
ALT. MFG. #1 Shelley
ALT. MFG. #2 Duke

Remarks:

- Integrate with item #24 Utility Counter

- Load center to serve (2) #21, (2) #23, and #24

- See HFS Detail 4.32

Two tier undershelfShop drawing required

ITEM #66 CEILING HUNG POT RACK

Quantity: One (1)

Manufacturer: AERO Manufacturing

Model: CPS-60 ALT. MFG. #1 Advance ALT. MFG. #2 Eagle

Features:

- Model CPS-60 Pot Rack, ceiling mount, 60"W x 24"D x 16"H, triple-bar design, constructed of 3/16" x 2" stainless steel flat bar, includes plated double-pronged pot hooks (one per rung per foot) & (4) 24" chrome-plated chains for mounting, fully welded, NSF

ITEM #67 AIR TREATMENT SYSTEM

Quantity: One (1)
Manufacturer: Franke
Model: APS300
ALT. MFG. #1
ALT. MFG. #2
N/A

Features:

- Model APS300 (18008700) APS300, Ozone/UV Air Purification System, for Walk-In Coolers, commercial grade, heavy duty, extends shelf life of fresh produce, eliminates chemicals that cause over-ripening in fruits and vegetables, eliminates flavor transfer among foods, minimizes waste, walk-in cooler volume capacity up to 2500 cubic feet, front mounted on/off switch, LED indicator lamp, push-to-reset circuit breaker, audible lamp replacement reminder, front/side standoff bumpers, 304 stainless steel construction, 6' power cord with plug, NSF, cULus (UV bulbs require annual replacement)

ITEM #68 HIGH PRESSURE WASHING SYSTEM

Quantity: One (1)

Manufacturer: Sage Sanitizing Systems

Model: 061107R ALT. MFG. #1 Spay Master ALT. MFG. #2 Honda

ITEM #69 STRIP CURTAIN UNIT

Quantity: One (1)

Manufacturer: Berner

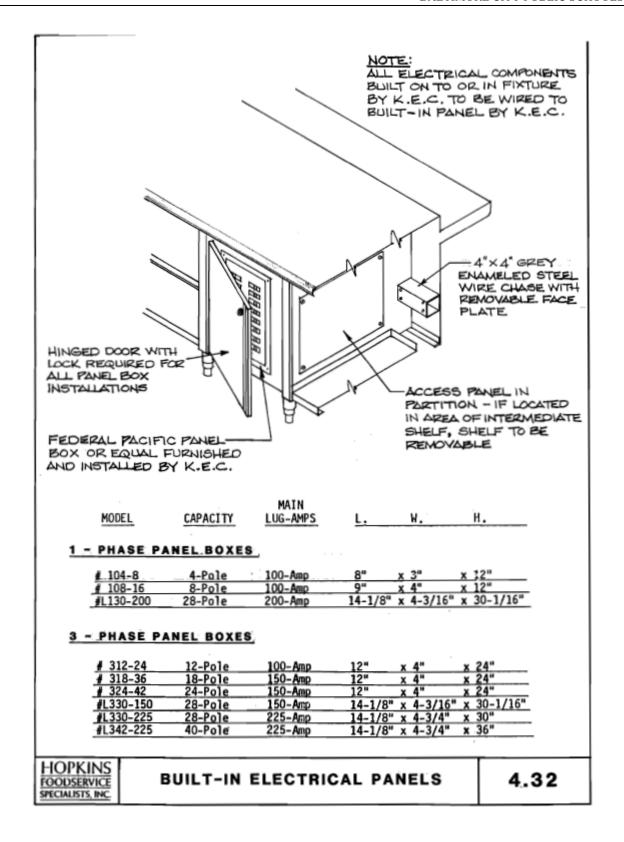
Model: ESA040084

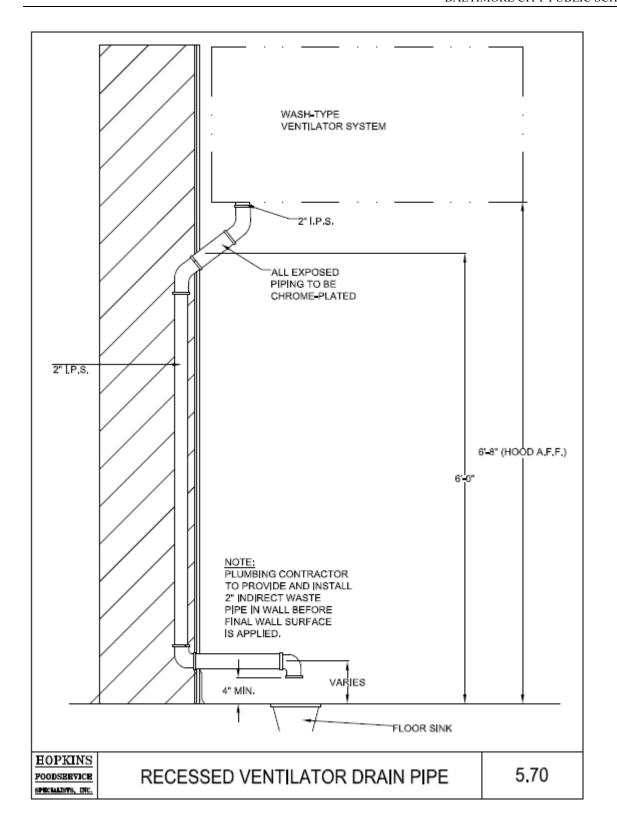
ALT. MFG. #1 Curtron

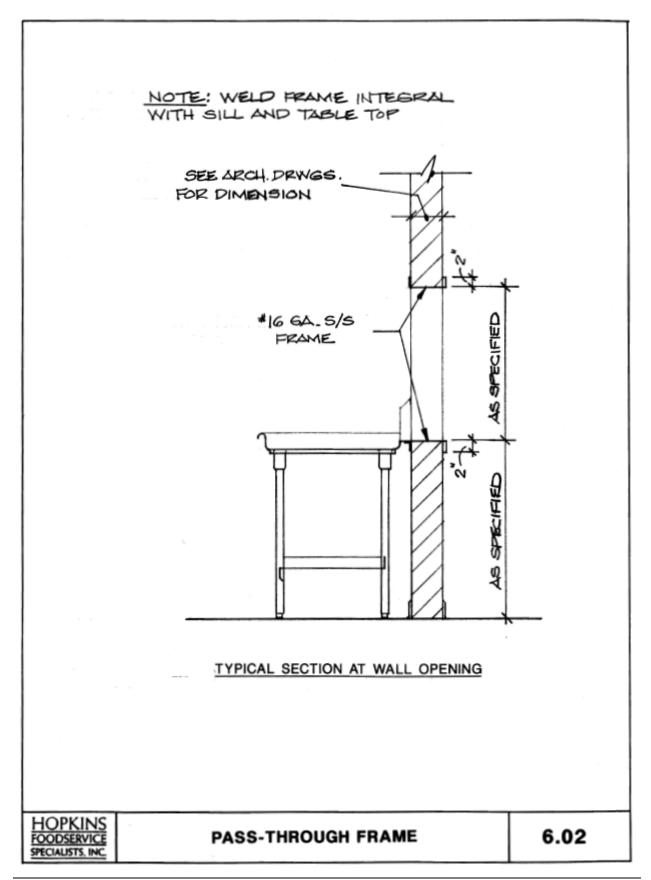
ALT. MFG. #2 Aleco

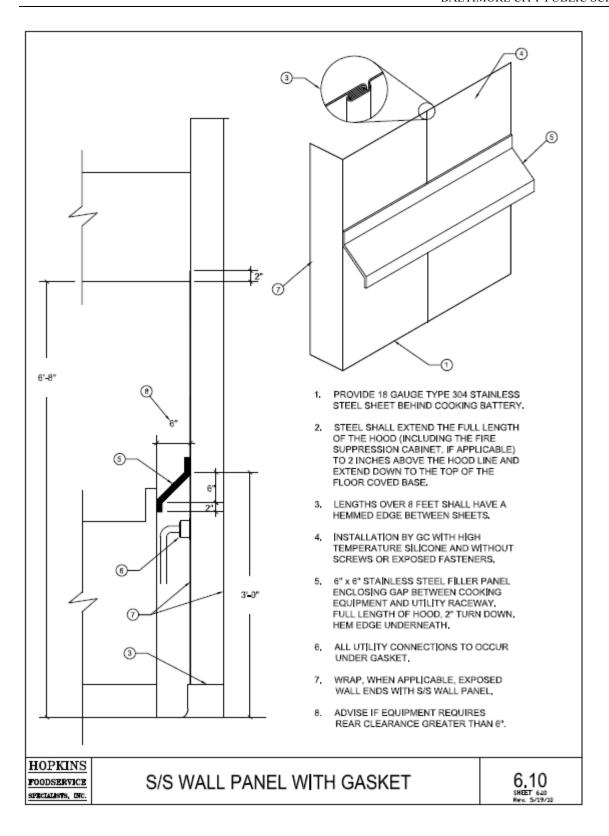
2.2 STANDARD DETAIL INDEX

4.32	Built-in Electrical Panels
5.70	Recessed Ventilator
6.02	Pass-Through Frame
6.10	Wall Panel With Gasket









PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install foodservice equipment level and plumb, according to manufacturer's written instructions.
 - 1. Connect equipment to utilities.
 - 2. Provide cutouts in equipment, neatly formed, where required to run service lines through equipment to make final connections.
- B. Complete equipment assembly where field assembly is required.
 - 1. Provide closed butt and contact joints that do not require a filler.
 - 2. Grind field welds on stainless-steel equipment until smooth and polish to match adjacent finish.
- C. Install equipment with access and maintenance clearances that comply with manufacturer's written installation instructions and with requirements of authorities having jurisdiction.
- D. Install cabinets and similar equipment on bases in a bed of sealant.
- E. Install closure-trim strips and similar items requiring fasteners in a bed of sealant.
- F. Install joint sealant in joints between equipment and abutting surfaces with continuous joint backing unless otherwise indicated. Produce airtight, watertight, vermin-proof, sanitary joints.

3.2 CLEANING AND PROTECTING

- A. After completing installation of equipment, repair damaged finishes.
- B. Clean and adjust equipment as required to produce ready-for-use condition.
- C. Protect equipment from damage during remainder of the construction period.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to commission exhaust system and train Owner's maintenance personnel to adjust, operate, and maintain foodservice equipment.

END OF SECTION 114000

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 1 - WORK TABLE (1 EA REQ'D)

John Boos ST4R5-2460SBK

Work Table, 60"W x 24"D, 14/300 stainless steel top with 5" backsplash & turndown, Stallion safety edge front, 90° turndown on sides, stainless steel legs, side & rear adjustable bracing, NSF, KD

ACCESSORIES

Mfr	Qty	Model	Spec
Edlund	1	G-2	Can Opener, manual, 16" welded stainless steel shaft, melonite arbor, with standard length bar and plated base, NSF certified
Edlund	1		1 year limited warranty, standard



ITEM #:	QTY:
MODEL #:	
PROJECT NAME: _	

3601 S. Banker St. Effingham, IL 62401 • P.O. BOX 609 • Ph: (888) 431-2667 • Fax: (800) 433-2667

"ST4R5-SBK" STAINLESS STEEL TOP WORK TABLES





14GA TOP W/5" RISER AND STAINLESS STEEL LEGS AND ADJUSTABLE BRACING

FEATURES:

- 14 GAUGE STAINLESS STEEL TOP W/ 5" RISER & TURNDOWN
- TYPE 300 STAINLESS STEEL WITH # 4 POLISH, SATIN FINISH
- TOP IS SOUND DEADENED
- REINFORCED WITH 1"X2" CHANNEL RUNNING ENTIRE LENGTH OF TABLE
- 1-1/2" STALLION EDGE ON FRONT SIDE EDGES
 90 DEGREE BEND DOWN FOR TABLE LINE-UP
- STAINLESS STEEL BASE WITH ADJUSTABLE BRACING
- ADJUSTABLE BULLET FEET
- · SHIPPED KNOCKED-DOWN, EASY-TO-ASSEMBLE
- NSF CERTIFIED

CONSTRUCTION:

• TOP: STAINLESS STEEL TOPS ARE TIG WELDED, EXPOSED WELDS ARE POLISHED TO MATCH ADJACENT SURFACE.

MATERIAL:

132

- TOP: 14 GAUGE STAINLESS STEEL TYPE 300 STAINLESS STEEL WITH # 4 POLISH, SATIN FINISH
- BRACING: 1-1/4" ROUND O.D. 18 GAUGE STAINLESS STEEL
- LEGS: 1-5/8" ROUND O.D. 16 GAUGE TUBULAR STAINLESS STEEL
- GUSSETS: STAINLESS STEEL
- FEET: 1" ADJUSTABLE STAINLESS BULLET FEET





ADJUSTABLE BRACING

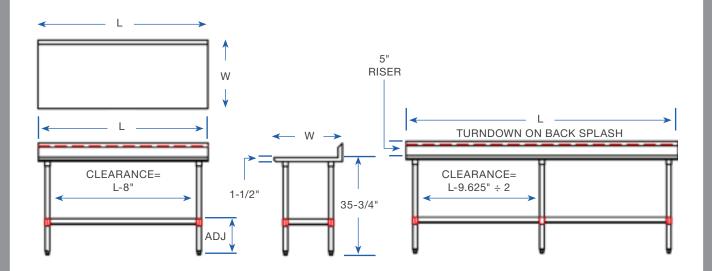
14 GAUGE TOP W/ ADJUSTABLE BRACING

24" WIDE	QTY	30" WIDE	QTY	36" WIDE	QTY
ST4R5-2436SBK		ST4R5-3036SBK		ST4R5-3636SBK	
ST4R5-2448SBK		ST4R5-3048SBK		ST4R5-3648SBK	
ST4R5-2460SBK		ST4R5-3060SBK		ST4R5-3660SBK	
ST4R5-2472SBK		ST4R5-3072SBK		ST4R5-3672SBK	
ST4R5-2484SBK		ST4R5-3084SBK		ST4R5-3684SBK	
ST4R5-2496SBK		ST4R5-3096SBK		ST4R5-3696SBK	
ST4R5-24108SBK		ST4R5-30108SBK		ST4R5-36108SBK	
ST4R5-24120SBK		ST4R5-30120SBK		ST4R5-36120SBK	

OPTIONAL ACCESSORIES

OF HORAL ADDEDUCTRIES							
DESCRIPTION	MODEL#	QTY					
DRAWER							
DRAWER LOCK							
CASTERS							
OVERSHELVES							
SINKS							
POT RACK							

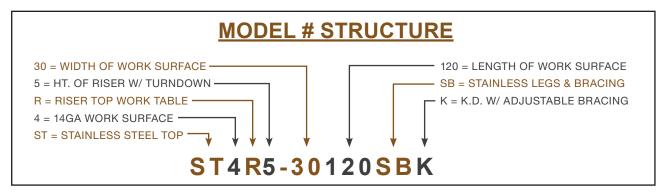
DETAILED SPECIFICATIONS



• UNITS 7 FT. AND LARGER ARE FURNISHED WITH SIX LEGS.

14 GAUGE TOP W/ ADJUSTABLE BRACING

LENGTH	24" WIDE	WT. (LBS)	30" WIDE	WT. (LBS)	36" WIDE	WT. (LBS)
36"	ST4R5-2436SBK	55	ST4R5-3036SBK	61	ST4R5-3636SBK	70
48"	ST4R5-2448SBK	67	ST4R5-3048SBK	74	ST4R5-3648SBK	75
60"	ST4R5-2460SBK	79	ST4R5-3060SBK	88	ST4R5-3660SBK	86
72"	ST4R5-2472SBK	90	ST4R5-3072SBK	101	ST4R5-3672SBK	102
84"	ST4R5-2484SBK	106	ST4R5-3084SBK	119	ST4R5-3684SBK	120
96"	ST4R5-2496SBK	122	ST4R5-3096SBK	136	ST4R5-3696SBK	137
108"	ST4R5-24108SBK	135	ST4R5-30108SBK	149	ST4R5-36108SBK	150
120"	ST4R5-24120SBK	146	ST4R5-30120SBK	162	ST4R5-36120SBK	164



SOME UNITS SHIP UNASSEMBLED FOR REDUCED SHIPPING COST. ALL DIMENSIONS ARE TYPICAL. TOLERANCE +/- .500" John Boos & Co. is constantly engaged in a program of improving products and therefore reserves the right to change specifications without prior notice.



3601 S. Banker St. • Effingham, IL 62401 • PO BOX 609 • quotes@johnboos.com

G-2 Series NSF Manual Can Opener

Edlund's new lighter duty G Series Can Openers are now NSF Certified. Utilizing the patented take-apart design of our famous S-11 openers, these new easy to clean, quick change can openers will meet the requirements of most any Foodservice operation. The "G" in our G-2 opener stands for Global. If you search the world over, you would not find a better all-around opener.



- NSF Certified
- Patented take-apart design
- Stainless steel gear

- Stainless steel reversible blade for longer life
- Welded stainless steel shaft
- New base design features a replaceable insert for tighter and smoother action
- Made in U.S.A.

Edlund G-2 Item #1

These can openers are a "G" Force to be reckoned with.





Like its big brothers, the S-11 and U-12, the G-2 is easily disassembled for quick change of knife and gear or easy cleaning.



SPECIFICATIONS:

MODEL#	DESCRIPTION	BAR Length	PRODUCT CODE	CASE CUBE FT³/M³	CASE WEIGHT LBS./KGS
G-2	NSF can opener with standard length bar and plated base	16" (40.6 cm)	16100	3.3/1.0	18/8.1
G-2 S	NSF can opener with standard length bar and stainless steel base	16" (40.6 cm)	16200	3.3/1.0	18/8.1
G-2 L	NSF can opener with long bar and plated steel base	22" (55.9 cm)	16500	3.3/1.0	20/9
G-2 SL	NSF can opener with long bar and stainless steel base	22" (55.9 cm)	16600	3.3/1.0	20/9
G-2 CL	NSF can opener with long bar and cast stainless steel clamp base	22" (55.9 cm)	16700	3.3/1.0	20/9
ST-93	Rustproof can opener cleaning tool		38500		.5/.2

Note: G-2 Series standard length bar is 16'' (40.6 cm) long. Extra long bar is 22'' (55.9 cm) long.







Edlund Company, Inc., 159 Industrial Parkway, Burlington, VT 05401 800-772-2126 www.edlundco.com

WARRANTY INFORMATION: THE EDILINO COMPANY WARRANTS THESE PRODUCTS TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF PURCHASE. THE COMPANY'S OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIRING OR REPLACING WITHOUT CHARGE ANY PART OR PARTS FOUND TO BE DEFECTIVE UNDER NORMAL USE, IT IS THE RESPONSIBILITY OF THE PURCHASER TO RETURN THE ENTIRE UNIT TO THE FACTORY, TRANSPORTATION CHARGES PREPAID. THIS WARRANTY DOES NOT COVER PARTS THAT MUST BE REPLACED UNDER NORMAL USE, INCLUDING KNIVES AND DRIVE GEARS ON CAN OPENERS. NO OTHER WARRANTY, WRITTEN OR VERBAL, IS AUTHORIZED BY THE COMPANY, WARRANTY INFORMATION OUTSIDE THE UNITED STATES MAY VARY, CONSULT YOUR DISTRIBUTOR.

9/04 EDOT-311

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 2 - EXHAUST HOOD (1 EA REQ'D)

Halton CUSTOM

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 3 - HOOD CONTROL PANEL (1 EA REQ'D)

Halton CUSTOM

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 4 - FIRE SUPPRESSION SYSTEM (1 EA REQ'D)

Ansul R-101

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 5 - CONVECTION OVEN (1 EA REQ'D)

Duke 613-G2V

Convection Oven, gas, double-deck, standard depth, with 8" stainless steel legs & adjustable stainless steel feet, feet, 65/35 stainless steel dependent doors, (1) window, (6) racks, (13) rack positions, porcelain interior, mech. snap action thermostat (200°-500°F), 60 minute dial timer with buzzer & (2) speed fan, ENERGY STAR®

ACCESSORIES

Mfr	Qty	Model	Spec
Duke	1		Gas type to be specified
Duke	1		120v/60/1-ph, 3.5 amps, with cord & plug, per deck

Duke

Specifications

F.O.B St. Louis, Missouri 63102



OPTIONS:

Stain	less stee	el interior
-------	-----------	-------------

- Stainless steel back enclosure panel
- Seismic feet
- 48" flexible disconnect, w/restraining device
- Down draft hood
- Common gas manifold
- Double stack shipped assembled
- □ Flue deflector
- Casters
- Porcelain drip tray
- Extra oven racks standard and deep depth
- Prison package tamper proof screws, lexan hinged cover with lockable clasp
- Extended warranty

AGENCY LISTINGS:









DUKE MANUFACTURING CO. 2305 N. Broadway St. Louis, MO 63102

800.735.3853 Toll Free 314-231-1130 In Missouri 314.231.5074 Fax www.dukemfg.com

PRODUCT INFORMATION: PROJECT:

ITEM:
QUANTITY:

MODEL:

Duke Convection Ovens Double Section - Standard Depth - Gas

☐ **613-G2** Double section, standard depth

STANDARD FEATURES:

- 6 racks/13 rack positions
- Porcelain interior finish
- 65/35 stainless steel doors chain driven
- Double pane glass in 65 door
- 8" angular stainless steel legs/adjustable feet

OVEN SECTION:

- Stainless steel front, sides and top
- 1-1/2" insulation on bottom, sides and back
- 3" insulation on top

OVEN CONTROLS:

- "V" Basic snap action thermostat (200°- 500°F), 60 minute electric dial timer with continuous sound buzzer, 2-speed fan
- "XX" Solid state digital time and temperature controls, 12-hour countdown timer, **Cook and Hold** feature, 2-speed fan, Pulse fan capability

SHORT FORM SPECIFICATIONS:

Duke Convection Ovens - Gas - Double Section - Standard

Depth. Front, sides, top, door, interior door liners and door gaskets shall be constructed of stainless steel. 20% larger interior cavity than industry standard. Porcelain interior finish, with 6 racks and 13 rack positions, and 7/8" coved corners. Unit shall have independently opening doors and 8" angular stainless steel legs with adjustable feet. Unit shall have 65/35 stainless steel doors with double pane glass in 65 door. Doors shall be mounted on full length solid steel shafts and bronze bushings. Interior lighting to be (2) 50 watt, 155v bulbs. Bottom, sides and back shall be fully insulated with 1-1/2" thick insulation, top to have 3" thick insulation. Units shall have 40,000 BTU input, electronic pilot relight systems. 1/2 HP two speed blower motor, 115v, ON-0FF-COOL Down switch, manual gas shut-off on control panel. Built-n gas pressure regulator. Overall dimensions of unit shall be: 70-1/2" height, including 8" legs, 38" width, depth of 39-1/2" and cavity dimensions of 29"W x 24"H x 24"D.

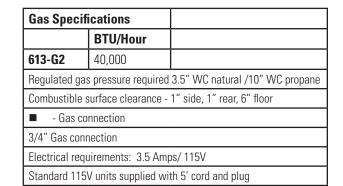
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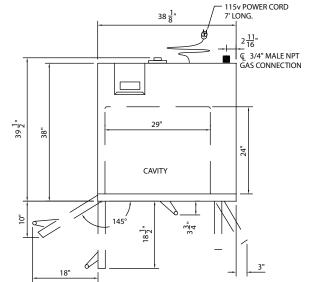
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Item #5

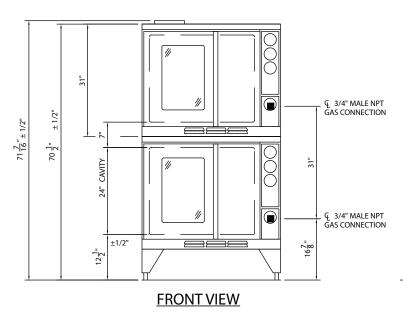
DUKE CONVECTION OVENS DOUBLE SECTION - GAS - STANDARD DEPTH

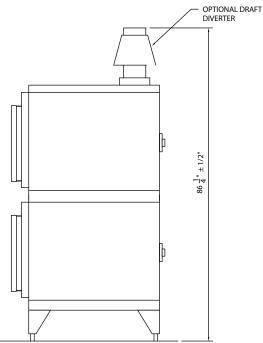
□ 613-G2 Double section, standard depth





TOP VIEW





RIGHT SIDE VIEW

DIMENSIONS: FREIGHT CLASS: 85

			Hei top v	-	Cube ft.	We	ight		
Model	in	cm	in.	cm	in.	cm	crated	lbs	kg
613-G2	39-1/2	100.3	38	96.5	70-1/2	179.1	69.7	1080	491.0

Specify gas type

Specify altitude over 2000 feet



DUKE MANUFACTURING CO. 2305 N. Broadway St. Louis, MO 63102

800.735.3853 Toll Free 800.231.1130 In Missouri 314.231.5074 Fax www.dukemfg.com

05/11 Printed in U.S.A © 2011, Duke Manufacturing Co.

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 6 - INDUCTION RANGE W/ STAND (1 EA REQ'D)

Garland US Range SHDUBA7000

Induction Dual Base-Line Cook Top, countertop, (2) burners, 12.6" x 22.8" ceran ceramic glass top, rotary controlled, (12) power level settings, removable grease filter, stainless steel construction, 6 ft cord, NEMA 15-30P, ETL, cETLus, CE, FCC (NET)

ACCESSORIES

Mfr	Qty	Model	Spec
Garland US Range	1		Two year on-site parts and labor warranty, covers products purchased and installed in the USA only, standard
Garland US Range	1		208v/60/3-ph, 7.0kW, 22.0 amps
Advance Tabco	1	VKS-302-CUSTOM	Work Table, 24"W x 30"D, 14 gauge 304 series stainless steel top with countertop non drip edge, 10" backsplash, adjustable stainless steel undershelf, stainless steel legs & adjustable bullet feet, NSF
Advance Tabco	1	US-30-24	Work Table Undershelf, for work tables 24"W x 30"D, 18 gauge stainless steel, NSF (actual shelf is 6" shorter than table width & depth)



Project: Approval: Date:

Induction Green Heat

nduction Dual Base-Line 7kW and 10kW Garland Induction Dual Base-Line 7kW and 10kW

Models:

GI-SH/DU/BA 7000

☐ GI-SH/DU/BA 10000



Induction Benefits:

- Energy Efficient
- · Fast Heat
- · Precise Cooking
- · Easy To Clean
- · No Pan, No Heat.
- Cool Operations
- · Boil Dry Protection

Standard Features:

- Compact table top design with stainless steel body and high impact ceramic glass top
- Sloped, easy to see front panel with adjustable control for easy operation
- Integral cooling fan keeps electronics cool, discharging from rear with protective air deflectors preventing hot exhaust to be pulled back into
- Removable, reusable easy to clean air intake filter
- 6' (1829mm) cord and plug supplied (60 cycle units only)
- "Flat Design", compact high performance electronics allow for low unit heights
- Instant energy transmission to
- Available in either 7kW or 10kW

- Multi sensors monitor overheat situations and shut the unit off to prevent damage from pans cooking dry
- Induction technology transfers heat to the pan. not to the surrounding air, allowing for cool operation
- Innovated new technology for pan detection; RTCSmp is an internal control software development matching speed, capability and performance.
- R Real Time
- T Temperature
- C Control
- S System
- m Multi
- p Point
- Electronic output limitation continually monitors the energy transfer to the pan, helping to ensure the most efficient energy transfer possible and the use of a variety of pan compositions.

Specifications:

Shall be a Garland Induction slim hob dual base-line GI-SH/DU/BA 7000 with a total kW rating of 7 kW or model GI-SH/DU/BA 10000 with a total kW rating of 10 kW. Built with a robust stainless steel exterior with a Ceran glass work top. Compact powerful electronic system for years of reliable service. Overheat sensors prevent damage of the unit if pan is run dry. Easy to operate rotary switch with 1 to 12 scale. Unit to come with integral cord and plug for 208V (specify at time of order), 60 Hz, 3 phase for North America.

Note: Induction cooking requires "Induction Ready" pans to operate.











CE models comply with the latest European Norms: EN 60335-1, EN 60335-2-36, EN 62233 (EMC/EMV)

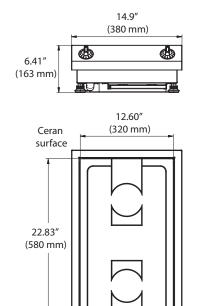
North American models: ETL listed in compliance with UL 197, CSA C22.2 No.109, NSF-4 Complies with FCC part 18, ICES-001

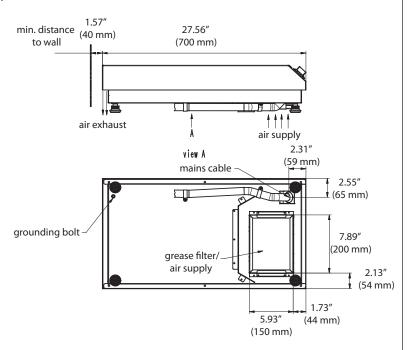
Garland Commercial Ranges Ltd. 1177 Kamato Road. Mississauga, Ontario L4W 1X4 CANADA

General Inquiries 1-905-624-0260 USA Sales, Parts and Service 1-800-424-2411 Canadian Sales 1-888-442-7526 Canada or USA Parts/Service 1-800-427-6668



RTCSmp Dual Base-Line 7000/10000





Options & Accessories:

•

Extra replacement air intake filter stock SKU# 71000003 (available as a replacement part through your local authorized parts & servcie depot)

Garland/U.S. Range products are not approved or authorized for home or residential use, but are intended for commercial applications only. Garland / U.S. Range will not provide service, warranty, maintenance or support of any kind other than in commercial applications.

Electrical Loading					
Model Watts 208/60/3 400/50/3 440/50/3					
GI-SH/DU/BA 7000	7000	22 amp	11 amp	10 amp	

Electrical Loading					
Model Watts 208/60/3 400/50/3 440/50				440/50/3	
GI-SH/DU/BA 10000	10000	30 amp	16 amp	15 amp	

Plug Configurations				
Model	Electrical Characteristics	Plug		
	208V/60Hz/3Ø	NEMA 15-30P		
GI-SH/DU/BA 7000	400V/50Hz/3Ø	EU 5-Pole		
	440V/50Hz/3Ø	Plug not included		
GI-SH/DU/BA 10000	208V/60Hz/3Ø	NEMA 15-50P		
	400V/50Hz/3Ø	EU 5-Pole		
	440V/50Hz/3Ø	Plug not included		

Form# GI-SH/DU/BA 7000/10000 (03/20/14)

Garland Commercial Ranges Ltd. 1177 Kamato Road, Mississauga, Ontario L4W 1X4 CANADA General Inquiries 1-905-624-0260 USA Sales, Parts and Service 1-800-424-2411 Canadian Sales 1-888-442-7526 Canada or USA Parts/Service 1-800-427-6668





STAINLESS STEEL

WORK TABLES

SPEC-LINE Series - 10" Backsplash - Undershelf Style



FEATURES:

Top is furnished with a 2" x 1" square die embossed NO-DRIP countertop edge with a 1/2" return on 3 sides and a 10" splash of with a 2" return on the rear side.

24" wide tables supplied with TWO hat channels stud welded to reinforce and maintain a level working surface. 30" and 36" wide tables supplied with THREE hat channels.

Pre-engineered welded angle adapters insure ease of future drawer installation.

Aluminum die cast "leg-to-shelf" clamp secures shelf to leg eliminating unsightly nuts and bolts. Undershelf is adjustable.

CONSTRUCTION:

All TIG welded. Exposed weld areas polished to match adjacent surfaces.

Entire top mechanically polished to a satin finish. Countertop edge polished to a MIRROR finish.

Top is sound deadened.

Roll formed embossed galvanized hat channels are secured to top by means of structural adhesive and weld studs.

Gussets welded to support hat sections.

VKS-Series: Stainless Steel Legs & Undershelf

L	24" Wide	30" Wide	36" Wide
30"	VKS-240	VKS-300	
24"	VKS-242	VKS-302	
36"	VKS-243	VKS-303	VKS-363
48"	VKS-244	VKS-304	VKS-364
60"	VKS-245	VKS-305	VKS-365
72"	VKS-246	VKS-306	VKS-366
84"	VKS-247	VKS-307	VKS-367
96"	VKS-248	VKS-308	VKS-368
108"	VKS-249	VKS-309	VKS-369
120"	VKS-2410	VKS-3010	VKS-3610
132"	VKS-2411	VKS-3011	VKS-3611
144"	VKS-2412	VKS-3012	VKS-3612





No-Drip DIE FORMED EDGE offers the Ultimate in Design & Function.



Featuring as Standard:
"THE PROVEN"
ORIGINAL ADVANCE TABCO
Adjustable Undershelf
with Die Cast Leg Clamp

MATERIAL:

VKS-SERIES: Stainless Steel Legs & Undershelf

TOP: 14 gauge stainless steel type "304" series.

SHELF: 18 gauge stainless steel.

LEGS: 1 5/8" diameter tubular stainless steel

type "304" series.

1" adjustable stainless steel bullet feet.

Stainless steel gussets.

VKG-SERIES: Galvanized Legs & Undershelf

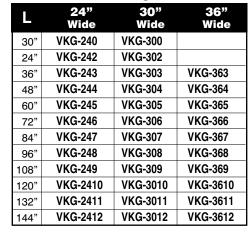
TOP: 14 gauge stainless steel type "304" series.

SHELF: 18 gauge galvanized steel.

LEGS: 1 5/8" diameter tubular galvanized steel.

1" adjustable plastic bullet feet. Galvanized steel gussets.

VKG-Series: Galvanized Steel Legs & Undershelf





Create Your Own Efficient Workstation with the Available Standard Accessories (Visit Section K)

ADVANCE TABCO.

SMART FABRICATION*

www.advancetabco.com

Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

Email Orders To: customer@advancetabco.com. For Smart Fabrication™ Quotes, Email To: smartfab@advancetabco.com or Fax To: 631-586-2933

NEW YORK Fax: (631) 242-6900 **GEORGIA** Fax: (770) 775-5625

TEXAS Fax: (972) 932-4795

NEVADA

Fax: (775) 972-1578

J-1

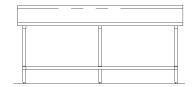
DETAILS and SPECIFICATIONS

ALL DIMENSIONS ARE TYPICAL TOL ± .500"

All Units Shipped Unassembled (KD) for Reduced Shipping Costs.

VKS & VKG Series Undershelf Style 10" Backsplash

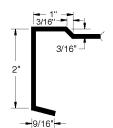
Finished size of undershelf = Length minus 5 3/4" Width minus 5 3/4"

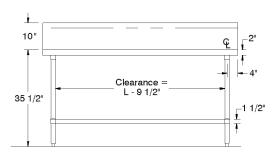


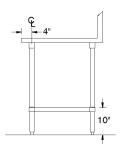
Units 8ft. and larger are furnished with six (6) legs



COUNTERTOP EDGE DETAIL







VKS-Series: Stainless Steel Legs & Undershelf

L	24" Wide	Wt.	30" Wide	Wt.	36" Wide	Wt.
30"	VKS-240	55 lbs.	VKS-300	70 lbs.		
24"	VKS-242	50 lbs.	VKS-302	56 lbs.		
36"	VKS-243	66 lbs.	VKS-303	77 lbs.	VKS-363	92 lbs.
48"	VKS-244	81 lbs.	VKS-304	92 lbs.	VKS-364	101 lbs.
60"	VKS-245	95 lbs.	VKS-305	111 lbs.	VKS-365	121 lbs.
72"	VKS-246	113 lbs.	VKS-306	129 lbs.	VKS-366	142 lbs.
84"	VKS-247	135 lbs.	VKS-307	153 lbs.	VKS-367	169 lbs.
96"	VKS-248	150 lbs.	VKS-308	171 lbs.	VKS-368	189 lbs.
108"	VKS-249	165 lbs.	VKS-309	289 lbs.	VKS-369	260 lbs.
120"	VKS-2410	268 lbs.	VKS-3010	294 lbs.	VKS-3610	315 lbs.
132"	VKS-2411	301 lbs.	VKS-3011	331 lbs.	VKS-3611	358 lbs.
144"	VKS-2412	316 lbs.	VKS-3012	346 lbs.	VKS-3612	373 lbs.

VKG-Series: Galvanized Steel Legs & Undershelf

L	24" Wide	Wt.	30" Wide	Wt.	36" Wide	Wt.
30"	VKG-240	55 lbs.	VKG-300	70 lbs.		
24"	VKG-242	50 lbs.	VKG-302	56 lbs.		
36"	VKG-243	66 lbs.	VKG-303	77 lbs.	VKG-363	92 lbs.
48"	VKG-244	81 lbs.	VKG-304	92 lbs.	VKG-364	101 lbs.
60"	VKG-245	95 lbs.	VKG-305	111 lbs.	VKG-365	121 lbs.
72"	VKG-246	113 lbs.	VKG-306	129 lbs.	VKG-366	142 lbs.
84"	VKG-247	135 lbs.	VKG-307	153 lbs.	VKG-367	169 lbs.
96"	VKG-248	150 lbs.	VKG-308	171 lbs.	VKG-368	189 lbs.
108"	VKG-249	165 lbs.	VKG-309	195 lbs.	VKG-369	260 lbs.
120"	VKG-2410	268 lbs.	VKG-3010	294 lbs.	VKG-3610	315 lbs.
132"	VKG-2411	301 lbs.	VKG-3011	331 lbs.	VKG-3611	358 lbs.
144"	VKG-2412	316 lbs.	VKG-3012	346 lbs.	VKG-3612	373 lbs.





STAINLESS STEEL & GALVANIZED

MID & UNDERSHELVES







Featuring as Standard:

"THE PROVEN"

ORIGINAL

ADVANCE TABCO

EXCLUSIVE

Adjustable Undershelf
with Die Cast Leg Clamp

FEATURES:

Die Cast Leg Clamp secured to shelf eliminates unsightly nuts and bolts.

Weight capacity = 20 lbs. per linear foot.

18 gauge stainless steel or galvanized steel.

STAINLESS STEEL

TABLE LENGTH	24"WIDE	30" WIDE	36" WIDE
24"	US-24-24	US-30-24	
30"	US-24-30	US-30-30	US-36-30
36"	US-24-36	US-30-36	US-36-36
48"	US-24-48	US-30-48	US-36-48
60"	US-24-60	US-30-60	US-36-60
72"	US-24-72	US-30-72	US-36-72
84"	US-24-84	US-30-84	US-36-84
96"	US-24-96	US-30-96	US-36-96
108"	US-24-108	US-30-108	US-36-108
120"	US-24-120	US-30-120	US-36-120
132"	US-24-132	US-30-132	US-36-132
144"	US-24-144	US-30-144	US-36-144

GALVANIZED STEEL

TABLE LENGTH*	24"WIDE	30"WIDE	36" WIDE
24"	UG-24-24	UG-30-24	
30"	UG-24-30	UG-30-30	UG-36-30
36"	UG-24-36	UG-30-36	UG-36-36
48"	UG-24-48	UG-30-48	UG-36-48
60"	UG-24-60	UG-30-60	UG-36-60
72"	UG-24-72	UG-30-72	UG-36-72
84"	UG-24-84	UG-30-84	UG-36-84
96"	UG-24-96	UG-30-96	UG-36-96
108"	UG-24-108	UG-30-108	UG-36-108
120"	UG-24-120	UG-30-120	UG-36-120
132"	UG-24-132	UG-30-132	UG-36-132
144"	UG-24-144	UG-30-144	UG-36-144

*NOTE: Actual Undershelf Length = 6" Shorter than Length & Width

ADVANCE TABCO®
SMART FABRICATION®
www.advancetabco.com

Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

Email Orders To: customer@advancetabco.com. For Smart Fabrication™ Quotes, Email To: smartfab@advancetabco.com or Fax To: 631-586-2933

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TEXAS Fax: (972) 932-4795

NEVADA Fax: (775) 972-1578

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 7 - TILTING SKILLET, GAS (1 EA REQ'D)

Cleveland SGL30T1

PowerPan™ Tilting Skillet, gas, 30-gallon capacity, bead blasted cooking surface, 10º tilt cooking feature, with easy manual hand tilt, spring-assisted cover with vent, gallon & liter markings, food strainer, stainless steel construction with open leg frame, CE, NSF, 125,000 BTU

ACCESSORIES

Mfr	Qty Model	Spec	
Cleveland	1	1-year limited warranty, standard	
Cleveland	1	Gas type to be specified	
Cleveland	1	120v/60/1-ph, 1.4 amp, standard	



BRAISING PANS / TILTING SKILLETS

Project
Item
Quantity
FCSI Section
Approval
Date

Power Pan ™ SERIES

GAS, 35" RIM HEIGHT, 30 & 40 GALLON (110 & 150 LITER)

MODELS:

Cleveland Standard Features

- Available in 30 & 40 gallon (115 & 150 liter) open frame design models. Full capacity to bottom of pouring lip.
- Exclusive Ultra Efficient Power Burner (Forced-Air) Gas Combustion System with Automatic Ignition.
- Exclusive Dual Power Settings: 90,000 and 125,000 Btu for 30 gallons, 160,000 Btu and 200,000 Btu for 40 gallons provides superior heat-up and recovery.
- Open base design for easy cleaning and maintenance.
- 5/8" Stainless Steel Bead Blasted cooking surface prevents warping and keeps food from sticking.
- Durable 12 gauge, 304 Stainless Steel pan construction. ¹/₈" (16mm) mild steel clad bottom plus a ¹/₁₆" (1.6mm) Stainless Steel plate for even temperature distribution.
- Low 35" rim height for easy operation and cleaning.
- Splash Proof Controls and construction.
- Supplied with Cord & Plug for 115-volt controls.
- Easy-to-turn manual hand tilt with enclosed permantly lubricated gearbox. Optional power tilt with manual override available.
- Gallon/Liter Markings and Vented Spring Assist Cover standard.
- Available with Optional 2" Tangent Draw-Off Valve.
- 10° Cooking Feature. Tilt unit up to 10° without the power being turned off.
- Adjustable, Electronic Thermostat accurately controls temperature from 100° to 450° F.
- Electronic "Spark Ignition System Standard".
- Spring-Assist Cover with full width handle and vent.
- Typical approvals include AGA, CSA, CE and NSF.

Options & Accessories

- ☐ Power Tilt with Manual Override (PT2)
- □ 2" (50 mm) Tangent Draw-Off Valve (TD2SK), left side only
- Double or Single Pantry Faucet (SPS14, DPS14), includes Faucet Mounting Bracket
- ☐ Faucet Bracket (FBKT1)
- Pan Carriers (PCS), not available on 30 gallon models with a Tangent Draw-Off Valve
- ☐ Vegetable Steamer Baskets (VS)

Shown with optional 2" Tangent Draw Off Valve

☐ *SGL-30-T1*

SGL-40-T1

Short Form Specifications

Shall be CLEVELAND, Tilting Skillet Model Number SGL-__-T1, gas (type___) holding no less than ___gallons (___ liters); Complete with Dual Power Setting, Normal and High Power Cooking Controls, Power Burner (Forced-Air) Gas Combustion System, Automatic Ignition, Splash-Proof Construction, Spring Assist Cover with Vent, Gallon/Liter Markings, 5/8" Stainless Steel Clad Cooking Surface with Bead Blasted Finish, Easy to use Manual Hand Tilt with Enclosed Permantly Lubricated Gearbox, Adjustable Feet with Rear Flanged and Front Bullet Style.

- ☐ Hot & Cold Water Pre-Rinse Spray Head with Hose (PRS-S)
- Poaching Pans (PP)
- ☐ Voltage Option:
 - VOŠK3, 440/480 Volt, 60 Hz, 3 Phase
 - VOSK4, 220/240 Volt, 50 Hz, 1 Phase for export
- ☐ Protective Control Cover (CP-PCB-T1)
- Casters, 2 swivel, 2 locking (CST1)

SECT. XII PAGE 11

1333 East 179 St., Cleveland, Ohio, U.S.A. 44110 Tel: 1-216-481-4900 Fax: 1-216-481-3782 Web Site: www.ClevelandRange.com Email: Steam@ClevelandRange.com



DIMENSIONS

MODEL	A	В	С	D	E (combustible wall)	(non-com- bustible wall)	F	G	Н
SGL-30-T1	37 7/8"	24 1/2"	31 3/4"	12"	3 1/2"	2	18 1/4"	5 3/4"	8"
3GL-30-11	(963mm)	(623mm)	(807mm)	(305mm)	(89mm)		(464mm)	(146mm)	(204mm)
SGL-40-T1	49 7/8"	36 1/2"	43 3/4"	18"	3 1/2"	2	24 1/4"	5 3/4"	8"
3GL-40-11	(1267mm)	(928mm)	(1112mm)	(458mm)	(89mm)	4	(616mm)	(146mm)	(204mm)

CAPACITIES

In 4 oz. servings. Other sizes may be calculated. 30 gallons / 115 Liters......960 40 gallons / 150 Liters.....1280

SPECIFICATIONS

② ELECTRICAL SUPPLY		CLEARANCE	APPROX. SHIPPING WEIGHTS	
VOLTS: 120 220/240 PHASE: 1 1 AMPS: 1.4 1.5 FREQ: 60 HZ 50 HZ	TYPE: NAT or LP WATER COLUMN: 3.5 (NAT), 10 (LP) BTU PER CU. FT.: 1025 (NAT), 2500 (LP) SUPPLY PRESSURE: 5' W.C. MIN (NAT), 11" W.C. MIN (LP) BTU RATINGS: SGL-30-T: 125,000 per hour SGL-40-T: 200,000 per hour	RIGHT: 4" (102mm) (manual tilt) 1" (26mm) (power tilt) LEFT: 0" REAR: 0 (non-combustible wall) 3.5" (89mm) (combustible wall)	SGL-30-T1 520 LBS. 235 KG. SGL-40-T1 560 LBS. 255 KG.	C (134mm) (FAUCET OPEN) E (MINIMUM)
15 38" 1042mm 731mm (PAN SURFACE) 38" 966mm	(PAN SURFACE) 5/8" 2" 7mm TD 2 OUTLET	2" (51mm) 1" (26mm) (MAXIMUM ADJUSTMENT) FLANGED (REAR L	24" × 20" (6 4 7/8" (12 120° 7/16"Ø, 3 H ON 3 1/8" (15	SUGGESTED FLOOR DRAIN DETAIL HOLES (80mm) B.C.D.
39" 35" 889mm (RIM HEIGHT) 23" 585mm		RECOMMEN SLOPE 1" (26mm) INIM 6" (153mm) RECOMMI	UM FLO	OR DRAIN PIPE DRAIN RECOMMENDED MINIMUM VALVE SIZE PLUS 1" (26mm) ZERO CLERANCE FOR NON-COMBUSTIBLE WALL, 3 1/2" (89mm) MINIMUM CLEARANCE FOR COMBUSTIBLE WALL

Cleveland Range reserves right of design improvement or modification, as warranted.

Many regional, state and local codes exist and it is the responsibility of the owner and installer to comply with the codes.

Cleveland Range equipment is built to comply with applicable standards for manufacturers. Included among those approval agencies are U.L., NSF, CGA, CSA, ETL and others.

(NOT TO SCALE)

SECT. \overline{XII} PAGE 120609

Litho in U.S.A.

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 8 - POT / KETTLE FILLER FAUCET (1 EA REQ'D)

T&S Brass B-0598

Pot Filler Faucet, splash mount, 8" centers, double-jointed, 24"L, with insulated off-on control valve at outlet, 1/2" IPS female inlet

T&S BRASS AND BRONZE WORKS, INC.

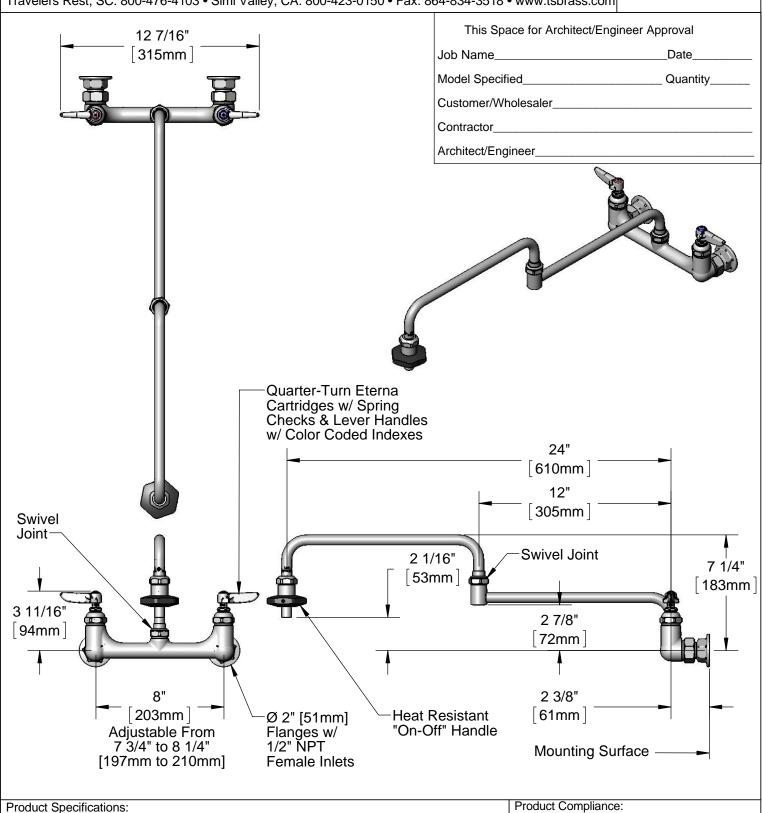
2 Saddleback Cove / P.O. Box 1088 Travelers Rest, SC 29690

Model No.

B-0598

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com



8" Wall Mount Pot Filler Mixing Faucet, Quarter-Turn Eterna Cartridges w/ Spring Checks, Lever Handles, 24" Double Joint Swing Nozzle, Heat Resistant Handle & 1/2" NPT Female Inlets

Approved:

JHB

Date:

03/08/16

JRM

Scale:

ASME A112.18.1 / CSA B125.1 NSF 61 - Section 9 NSF 372 (Low Lead Content)

Drawn:

Graceland/Holabird

Checked:

1:6

Sheet: 1 of 2



T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088 Travelers Rest, SC 29690 Model No.

B-0598

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com

	ITEM NO.	SALES NO.	DESCRIPTION
	1	002869-40	12" Front Section
	2	000936-45	Handle Set Screw
	3	001126-20	Handle w/ (2) Set Screws
	4	035A	Outlet
	5	000587-25	Spout Body
	6	001498-25	Spout
	7	001089-45	Seal
	8	003426-45	O-Ring
	9	002872-40	24" Double Joint Nozzle
	10	009538-45	Swivel Washer
9	11	011429-45	Swivel Sleeves (2)
	12	001074-45	O-Ring
10	13	002871-40	12" Back Section
	14	001661-45	Red Index-HW
11 (12) (13)	15	000922-45	Lever Handle Screw
	16	001660-45	Blue Index-CW
(12) (13)	17	002711-40	Quarter-Turn Eterna Cartridge, LTC w/ Spring Check, Handle, Index & Screw
	18	001638-45	Lever Handle
	19	012442-40	Quarter-Turn Eterna Cartridge, LTC w/ Spring Check
	20	00AA	1/2" NPT Female Eccentric Flange
	21	001019-45	Coupling Nut Washer
5	22	002712-40	Quarter-Turn Eterna Cartridge, RTC w/ Spring Check, Handle, Index & Screw
	23	012443-40	Quarter-Turn Eterna Cartridge, RTC w/ Spring Check
(4) (3) (2) (1) (23) (14)		15 16	
		(17)	
		40	
		(18)	
(22)		(19)	
		21 20	
Product Specifications:			Product Compliance:

Product Specifications:

8" Wall Mount Pot Filler Mixing Faucet, Quarter-Turn Eterna Cartridges w/ Spring Checks, Lever Handles, 24" Double Joint Swing Nozzle, Heat Resistant Handle & 1/2" NPT Female Inlets

ASME A112.18.1 / CSA B125.1 NSF 61 - Section 9 NSF 372 (Low Lead Content)

Page: 23

Drawn: DHL Checked: JRM Approved: JHB Date: 03/08/16 Scale: NTS Sheet: 2 of 3

Graceland/Holabird

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 9 - S/S WALL PANEL WITH GASKET (1 EA REQ'D)

Fabricator CUSTOM

From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 10 - SPARE NO.

<Spare No.>

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 11 - FLOOR TROUGH (1 EA REQ'D)

Eagle Group ASFT-1830-SG

Anti-Splash Floor Trough, 30"W x 18"D, stainless steel subway-style grating, 6" deep trough pan with built-in pitch toward drain, accommodates up to a 4" diameter drain pipe, includes removable perforated basket, all-welded 14/304 stainless steel construction

Floor Troughs

INSTALLATION INSTRUCTIONS

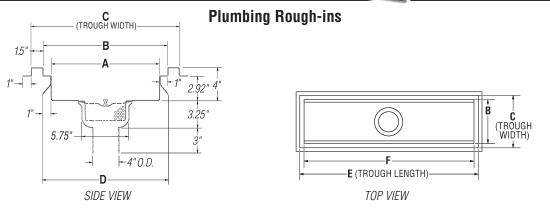
CAUTION

INSPECT CONTENTS IMMEDIATELY AND FILE CLAIM WITH DELIVERING CARRIER FOR ANY DAMAGE.

SAVE YOUR BOX AND ALL PACKING MATERIALS.

YOU ARE RESPONSIBLE FOR DAMAGE TO YOUR UNIT IF RETURNED IMPROPERLY PACKED.



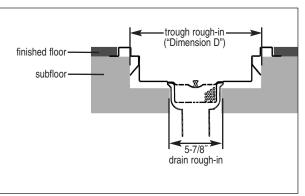


(see chart below for dimensions A through F)

12" (305mm)-WIDE TROUGHS dimension A: 7" (178mm) dimension B: 9" (229mm) dimension C: 12" (305mm) dimension D: 9.25" (232mm)	15" (381mm)-WIDE TROUGHS dimension A: 10" (254mm) dimension B: 12" (305mm) dimension C: 15" (381mm) dimension D: 12.25" (311mm)	18" (457mm)-WIDE TROUGHS dimension A: 13" (330mm) dimension B: 15" (381mm) dimension C: 18" (457mm) dimension D: 15.25" (387mm)	24" (610mm)-WIDE TROUGHS dimension Å: 19" (483mm) dimension B: 21" (533mm) dimension C: 24" (610mm) dimension D: 21.25" (540mm)		UGH GTHS nsion	dimer F	nsion
model #	model #	model #	model #	in.	mm	in.	mm
FT-1218-FG	n/a	n/a	n/a	18″	457	15″	381
FT-1224-FG	FT-1524-FG	FT-1824-FG	FT-2424-FG	24"	610	21″	533
FT-1230-FG	FT-1530-FG	FT-1830-FG	FT-2430-FG	30″	762	27"	686
FT-1236-FG	FT-1536-FG	FT-1836-FG	FT-2436-FG	36″	914	33″	838
FT-1248-FG	FT-1548-FG	FT-1848-FG	FT-2448-FG	48″	1219	45″	1143
FT-1260-FG	FT-1560-FG	FT-1860-FG	FT-2460-FG	60″	1524	57"	1448
FT-1272-FG	FT-1572-FG	FT-1872-FG	FT-2472-FG	72″	1829	69″	1753
FT-1284-FG	FT-1584-FG	FT-1884-FG	FT-2484-FG	84"	2134	81″	2057
FT-1296-FG	FT-1596-FG	FT-1896-FG	FT-2496-FG	96"	2438	93″	2362
FT-12120-FG	FT-15120-FG	FT-18120-FG	FT-24120-FG	120"	3048	117″	2972

The above chart indicates troughs with fiberglass grating. For troughs with ADA-approved wide "T" Bar fiberglass grating, add suffix "-ADA". Example: FT1224-FG-ADA For troughs with stainless steel grating, replace suffix "-FG" with "-SG". Example: FT1224-SG

- Size of rough-in hole for trough should be as follows:
 Width = "Dimension D"
- Length = "Dimension E"
- Depth = $4\frac{1}{4}$ "
- Size of rough-in hole for drain should be 5\%" diameter. Depth, to accommodate plumbing, may vary.
- · Place trough in hole.
- Lay finished floor so that it overlaps outer flange on all four sides of trough.
- · Lay grating inside trough accordingly.



EG10094 Revised 01/15



- 100 Industrial Boulevard, Clayton, Delaware 19938-8903 U.S.A. www.eaglegrp.com
- Phone: 302/653-3000 (Foodservice) 800/441-8440 (MHC/Retail) 800/637-5100
- Fax: 302/653-2065

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(End)

Anti-Splash Floor Troughs

INSTALLATION INSTRUCTIONS

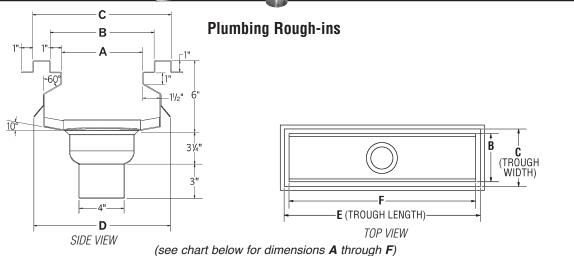
CAUTION

INSPECT CONTENTS IMMEDIATELY AND FILE CLAIM WITH DELIVERING CARRIER FOR ANY DAMAGE.

SAVE YOUR BOX AND ALL PACKING MATERIALS.

YOU ARE RESPONSIBLE FOR DAMAGE TO YOUR UNIT IF RETURNED IMPROPERLY PACKED.





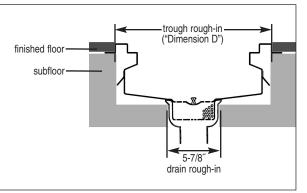
12" (305mm)-WIDE TROUGHS		18" (457mm)-WIDE TROUGHS		TRO	UGH	ĺ	
dimension A: 7" (178mm)	dimension A: 10" (254mm)	dimension A: 13" (330mm)	dimension A: 19" (483mm)	LEN(<u>STHS</u>	ĺ	
dimension B: 9" (229mm)	dimension B: 12" (305mm)	dimension B: 15" (381mm)	dimension B: 21" (533mm)	ı		ĺ	
dimension C: 12" (305mm)	dimension C: 15" (381mm)	dimension C: 18" (457mm)	dimension C: 24" (610mm)	dimer	nsion	dime	nsion
dimension D: 11.25" (286mm)	dimension D: 14.25" (362mm)	dimension D: 17.25" (438mm)	dimension D: 23.25" (591mm)	E		F	F
model #	model #	model #	model #	in.	mm	in.	mm
ASFT-1218-FG	n/a	n/a	n/a	18″	457	15″	381
ASFT-1224-FG	ASFT-1524-FG	ASFT-1824-FG	ASFT-2424-FG	24"	610	21″	533
ASFT-1230-FG	ASFT-1530-FG	ASFT-1830-FG	ASFT-2430-FG	30″	762	27″	686
ASFT-1236-FG	ASFT-1536-FG	ASFT-1836-FG	ASFT-2436-FG	36″	914	33″	838
ASFT-1248-FG	ASFT-1548-FG	ASFT-1848-FG	ASFT-2448-FG	48″	1219	45″	1143
ASFT-1260-FG	ASFT-1560-FG	ASFT-1860-FG	ASFT-2460-FG	60″	1524	57″	1448
ASFT-1272-FG	ASFT-1572-FG	ASFT-1872-FG	ASFT-2472-FG	72"	1829	69″	1753
ASFT-1284-FG	ASFT-1584-FG	ASFT-1884-FG	ASFT-2484-FG	84"	2134	81″	2057
ASFT-1296-FG	ASFT-1596-FG	ASFT-1896-FG	ASFT-2496-FG	96″	2438	93″	2362
ASFT-12120-FG	ASFT-15120-FG	ASFT-18120-FG	ASFT-24120-FG	120″	3048	117″	2972

The above chart indicates troughs with fiberglass grating. For troughs with ADA-approved wide "T" Bar fiberglass grating, add suffix "-ADA". Example: ASFT1224-FG-ADA For troughs with stainless steel grating, replace suffix "-FG" with "-SG". Example: ASFT1224-SG

- Size of rough-in hole for trough should be as follows:
 Width = "Dimension D"
 - Length = "Dimension E"

Depth = $6\frac{1}{4}$ "

- \bullet Size of rough-in hole for drain should be $5\%^{\prime\prime}$ diameter. Depth, to accommodate plumbing, may vary.
- Place trough in hole.
- Lay finished floor so that it overlaps outer flange on all four sides of trough.
- Lay grating inside trough accordingly.





- 100 Industrial Boulevard, Clayton, Delaware 19938-8903 U.S.A. www.eaglegrp.com
- Phone: 302/653-3000 (Foodservice) 800/441-8440 (MHC/Retail) 800/637-5100
- Fax: 302/653-2065

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02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 12 - COMBI OVEN (1 EA REQ'D)

Convotherm C4 ED 6.10EB

Convotherm Combi Oven/Steamer, electric, steam generator, (7) half size sheet pan or (7) 12" x 20" x 1" hotel pan capacity, easyDial control panel with digital display 9-stage & 99 cooking recipes storage, (4) cooking modes: hot air, steam, combi-steam & retherm, multi-point core temperature probe, five-speed auto reversing fan, anti-microbial hygienic door handle, pull-out spray hose, stainless steel construction

ACCESSORIES

Mfr	Qty Model	Spec
Convotherm	1	12 month parts and labor warranty and second 12 month parts only warranty, standard
Convotherm	1	208/240v/60/3-ph, 9/11.8 kW, 25.0/28.5 amps, standard
Convotherm	1	Door hinged right, standard
Convotherm	1	A water analysis is required for the proper selection of a water treatment system.



Combi steamer

Project
ltem
Quantity
FCSI section
Approval
Date

Model

Convotherm 4 easyDial

easyDial

- 7 slide rails
- Electrical
- Boiler
- Right-hinged door

Key features

- ACS+ operating modes: Steam, combi-steam, hot air
- ACS+ extra functions:
 - Crisp&Tasty 5 moisture-removal settings
 - O BakePro 5 levels of traditional baking
 - HumidityPro 5 humidity settings
 - Controllable fan 5 speed settings
- easyDial: all functions are set in one operating level
- Semi-automatic cleaning system
- HygienicCare
- USB port integrated in the control panel
- TriColor indicator ring indicates the current operating status
- Steam generated by high-performance boiler outside the cooking chamber
- Right-hinged door





Standard features

- ACS+ (Advanced Closed System +) operating modes:
 - Steam (86-266°F) with guaranteed steam saturation
 - Combi-steam (86-482°F) with automatic humidity adjustment
 - O Hot air (86-482°F) with optimized heat transfer
- HygienicCare food safety provided by antibacterial surfaces:
 - easyDial control panel
 - Door handle and recoil hand shower
- easyDial user interface:
 - Convotherm Dial (C-Dial) central control unit
 - Digital display
 - Retherming function retherm products to peak quality
 - 99 cooking profiles each containing up to 9 steps
- Multi-point core temperature probe
- Door handle with safety latch and slam function
- Data storage for HACCP and pasteurization figures
- Preheat and Cool down function

Options

- ConvoClean fully automatic cleaning system with optional single-dose dispensing
- Steam and vapor removal built-in condenser (upon request)
- Disappearing door more space and added safety (see page 2)
- Marine version (see separate data sheet)
- Ethernet port (LAN)
- Available in various voltages
- Sous-vide probe, external connection
- Core temperature probe, external connection

Accessories

- ConvoLink HACCP and cooking-profile management PC software
- Signal tower indicates the operating status from a distance
- Banquet system (optionally as a package or individually): Plate rack, mobile shelf rack, transport trolley, thermal cover
- Equipment stands in various sizes and designs
- Racks for cooking and baking
- Stacking kits
- Cleaning products for the fully automatic ConvoClean cleaning system and the semi-automatic cleaning system





1

Manitowoc Foodservice 18301 St. Clair Ave. Cleveland, Ohio 44110 Phone 1-800-338-2204

www.convotherm.com

Manitowoc



Dimensions

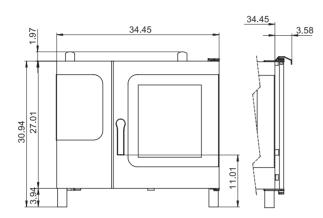
Item #12

Weights

Views

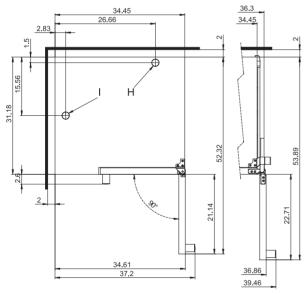
Front view

(disappearing door optional)



View from above with wall clearances

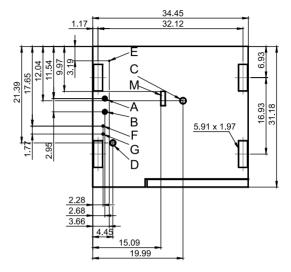
(disappearing door optional)



Installation requirements

Max. absolute appliance inclination during max. 2° (3.4%) operation*

Connection positions



- A Water connections (for boiler)
- **B** Water connections (for cleaning, recoil hand shower)
- C Drain connection (2" I. D.)
- **D** Electrical connection
- E Electrical ground
- **F** Rinse-aid connection
- **G** Cleaning-agent connection
- **H** Air vent (2" I. D.)
- I Ventilation port

Width x Height x Depth

M Safety overflow 3.2" x 1"

Dimensions and weights

Dimensions including packaging

Weight	
Net weight without options* / accessories	256 lbs
Packaging weight	55 lbs
Safety clearances**	

Rear 2 " Right (right-hinged door) 2 " Right (disappearing door pushed back) 5 " Left (18" clearance recommended for service) 2 "

* Max. weight of options: 42 lbs.

Top***

9938281_04 ENG_US405/15. © 2015 Manitowoc. Please note that the product is being continuously improved and that, as a result, these specifications are subject to change without notice

20"

43.3" x 39.8" x 37"

^{*} Adjustable appliance feet as standard.

^{**} Minimum clearance from heat sources: 20".

^{***} Depends on the type of exhaust system and the ceiling's characteristics.



Capacity

Electrical specifications

Water

Loading capacity

Max. number of food containers	
[Unit has 7 slide rails; rail spacing 2.68" max.]	
Steam table pans (12"x20"x1")	6
Steam table pans (12"x20"x2.5")	6
Wire shelves, half size (12"x20")	6
Sheet pans, half size (12"x20")	6
Frying baskets, half size (12"x20")	6
Plates (optional plate rack)	15
Max. loading weight	
Per combi steamer	66 lbs
Per shelf level	33 lbs

Electrical supply

208V 3PH 60Hz / 240V 3PH 60Hz *

Rated power consumption	9.0 / 11.8 kW
Rated current	25.0 / 28.5 A
Power supply wire gauge	8 AWG
Conductor insulation rating	194°F / 90°C
440V 3PH 60Hz / 480V 3PH 60Hz *	
Rated power consumption	9.2 / 10.9 kW
Rated current	12.1 / 13.1 A
Power supply wire gauge	12 AWG
Conductor insulation rating	194°F / 90°C

^{*} Prepared for connection to an energy optimizing system.

Water connections

Water supply	
Water supply	Two 3/4" I. D. GHT-M (garden hose adapter). The appliance is designed for a permanent hookup to the water supply that uses a connecting hose with a minimum diameter of 1/2"
Flow pressure	22 - 87 PSI / 1.5 - 6 bar
Drain	
Drain version	Permanent hookup (recommended) or funnel waste trap
Туре	2" I. D. (comes elbow-shaped as standard)
Slope for drainpipe	min. 3.5% (2°)

Water quality

Water connection A* for boiler,

Water connection B* for cleaning, recoil hand shower					
General requirements	Drinking water, typically untreated water				
TDS	70 - 360 ppm				
Hardness	70 - 360 ppm (4 - 21 gpg)				
pH value	6.5 - 8.5				
Cl ⁻ (chloride)	max. 60 ppm				
Cl ₂ (free chlorine)	max. 0.2 ppm				
SO ₄ ²⁻ (sulfate)	max. 150 ppm				
Fe (iron)	max. 0.1 ppm				
SiO ₂ (silica)	max. 13 ppm				
NH ₂ CI (monochloramine)	max. 0.4 ppm				
Temperature	max. 104°F / max. 40°C				

 $^{^{\}ast}$ See connection positions diagram, p. 2.

NOTICE: The owner/operator/purchaser must ensure that the water quality requirements are met. Otherwise the original equipment warranty is void.



Emissions

Water consumption

Accessories

Emissions

Heat emission

Latent 2000 BTU/h
Sensitive 2400 BTU/h

Drain temperature max. 140°F / 60°C

Decibel rating max. 70 dBA

Water consumption

Water connections A, B

Average consumption for cooking**	0.79 gph
Required flow rate	3.96 gpm

^{**} Incl. water required for cooling the wastewater.

NOTICE: See connection positions diagram, p. 2.

ACCESSORIES

(For more detailed information, please refer to the Accessories brochure.)

Stacking kit

Combinations allowed	6.10 on 6.10
	6.10 on 10.10

If combining two electrical units

Select the "stacking kit for Convotherm 4 electrical units"

If combining one electrical unit and one gas unit in a stacking kit

Select the "stacking kit for Convotherm 4 electrical units" if:

Bottom combi steamer EB/ES
Top combi steamer GB/GS

Select the "stacking kit for Convotherm 4 gas units" if:

Bottom combi steamer GB/GS
Top combi steamer EB/ES

Equipment stand

Standard support surface height 26.38"

Please note

- Please refer to the Installation manual for further technical data and for instructions on installation and setup.
- Convotherm reserves the right of design improvement or modification, as warranted.
- There are numerous federal, national and local laws, regulations and standards. It is the responsibility of the owner and installer to observe these laws, regulations and standards (e.g. fire regulations and health and safety standards).
- Convotherm combi steamers are built to comply with the applicable standards for manufacturers.

Manitowoc

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02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 12.1 - WATER FILTRATION SYSTEM (1 EA REQ'D)

Everpure EV910051

CB20-124E System, with single high pressure housing (1) CC1E Cartridge, pressure relief valve, outlet pressure gauge, mounting bracket, for high flow, high volume combination applications requiring chloramines reduction, 15,000 gallon capacity, 5.0 gpm



EVERPURE° CB20-124E WATER FILTER

HIGH FLOW, HIGH CAPACITY CARBON FILTER FOR CHLORINE

CB20-124E System: EV9100-51 124 Replacement Cartridge Kit: EV9105-02 Kit Contains: (1) CC1E Replacement Cartridge



APPLICATIONS

For Low-Volume, Single-Pot Coffee Brewers

FEATURES • BENEFITS

Improves the taste and consistency of beverages and ice by reducing chloramine, chlorine and other off-tastes and odors

Easily plumbs to existing filtration systems to add chloramine reduction capability

Complete modular package lets you expand capacity as needed

CC1E extended service cartridge contains radial flow granular activated carbon (GAC)

High pressure housing includes head, mounting bracket and bowl

Integral outlet pressure gauge monitors operation

INSTALLATION TIPS

Choose a mounting location suitable to support the full weight of the system when operating [30 lbs [13.6 kgs]].

3/4" FNPT inlet and outlet connection.

Install on cold water lines only.

Do not install where unit is exposed to direct sunlight.

Allow a minimum of 4" (10.16 cm) clearance under the filter to facilitate cartridge change.

Do not braze/solder fittings into head.

Never use a saddle valve for connection.

OPERATION TIPS

Change cartridge on a regular six (6) month preventative maintenance program.

Change cartridge when capacity is reached (15,000 gallons or 56,715 L) or when flow becomes too slow.

Change cartridge when the difference between the inlet pressure and the system outlet gauge is greater than or equal to 20 psi (104 bar).

Service flow rate must not exceed 5.0 gpm (19 Lpm).

Always flush the filter cartridge to drain for fifteen minutes at time of installation and cartridge change.

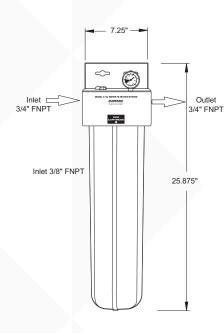
SIZING

Service Flow Rate: Maximum 5 gpm (19 Lpm)

FOODSERVICE | EV9100-51 SPECIFICATION SHEET

EVERPURE° CB20-124E WATER FILTER

FV9100-51



The contaminants or other substances removed or reduced by this drinking water system are not necessarily in your water. Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Systems certified for cyst reduction may be used with disinfected water that may contain filterable cysts.

SPECIFICATIONS

Rated Capacity

15,000 gallons (56,775 L)

Service Flow Rate

Maximum 5 gpm (19 Lpm)

Pressure Requirements

20 - 100 psi (1.4 - 6.9 bar), non-shock

Temperature Limits

35 - 100°F (2 - 38°C)

Overall Dimensions

25.87" H x 7.25" W x 8.5" D (65.7 cm x 18.4 cm x 21.5 cm)

Inlet Connection

3/4" FNPT

Outlet Connection

3/4" FNPT

Electrical Connection

None required

Operating Weight

22.0 lbs (9.9 kgs)

WARRANTY

Everpure water treatment systems by Pentair® (excluding replaceable elements) are covered by a limited warranty against defects in material and workmanship for a period of five years after date of purchase. Everpure replaceable elements (filter cartridges and water treatment cartridges) are covered by a limited warranty against defects in material and workmanship for a period of one year after date of purchase. See printed warranty for details. Pentair will provide a copy of the warranty upon request.



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EV9100-51 JL15

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 13 - MOBILE WORK TABLE W/ OVERSHELVES (5 EA REQ'D)

Advance Tabco TKSS-305

Work Table, 30" wide top, with splash at rear only, 60" long, with stainless steel legs, side & rear stainless steel crossrails, 14 gauge 304 series stainless steel top, 5" backsplash, stainless steel bullet feet

ACCESSORIES

Mfr	Qty	Model	Spec
Advance Tabco	5	TA-25	Casters, 5", swivel, with rubber wheels (set of 4) (2 with brakes)
Advance Tabco	5		12" wide
Advance Tabco	5	ODS-12-60	Overshelf, table mounted, double, 60"W x 12"D, 18 gauge 430 series stainless steel (non-adjustable, old style)
Advance Tabco	5		Center of table shelf location



STAINLESS STEEL

WORK TABLES

PREMIUM Series - 5" Backsplash - Open Base Style



FEATURES:

Top is furnished with 1 5/8" sanitary rolled rim edge on front and square sides, and a 5" splash with a 1" return on the rear side.

24" wide tables supplied with TWO hat channels stud welded to reinforce and maintain a level working surface. 30" and 36" wide tables supplied with THREE hat channels.

Pre-engineered welded angle adapters insure ease of future drawer installation.

Front to back Stretchers are welded to legs. Left to right Stretcher bolted to legs and requires assembly.

CONSTRUCTION:

All TIG welded. Exposed weld areas polished to match adjacent surfaces.

Entire top mechanically polished to a satin finish.

Top is sound deadened.

Roll formed embossed galvanized hat channels are secured to top by means of structural adhesive and weld studs.

Gussets welded to support hat sections.

Item #: ______ Qty #: _____ Model #: ______ Project #: ______



NEW ed Rim Edg

Rolled Rim Edges on Front & Splash on Back and Square Side Edges



1-5/8" LEG STRETCHERS Ensure Stability

MATERIAL:

TKSS-SERIES: Stainless Steel Legs - Open Base

TOP: 14 gauge stainless steel type "304" series.

STRETCHERS: 1 5/8" dia. tubular stainless steel.

LEGS: 1 5/8" diameter tubular stainless steel.

1" adjustable stainless steel bullet feet.

Stainless steel gussets.

TKLG-SERIES: Galvanized Legs - Open Base

TOP: 14 gauge stainless steel type "304" series.

STRETCHERS: 1 5/8" dia. tubular galvanized steel.

LEGS: 1 5/8" diameter tubular galvanized steel.

1" adjustable plastic bullet feet. Galvanized steel gussets.

TKSS-Series: Stainless Steel Legs & Stretchers

L	24" Wide	30" Wide	36" Wide
30"	TKSS-240	TKSS-300	
24"	TKSS-242	TKSS-302	
36"	TKSS-243	TKSS-303	TKSS-363
48"	TKSS-244	TKSS-304	TKSS-364
60"	TKSS-245	TKSS-305	TKSS-365
72"	TKSS-246	TKSS-306	TKSS-366
84"	TKSS-247	TKSS-307	TKSS-367
96"	TKSS-248	TKSS-308	TKSS-368
108"	TKSS-249	TKSS-309	TKSS-369
120"	TKSS-2410	TKSS-3010	TKSS-3610
132"	TKSS-2411	TKSS-3011	TKSS-3611
144"	TKSS-2412	TKSS-3012	TKSS-3612



L	24" Wide	30" Wide	36" Wide
30"	TKLG-240	TKLG-300	
24"	TKLG-242	TKLG-302	
36"	TKLG-243	TKLG-303	TKLG-363
48"	TKLG-244	TKLG-304	TKLG-364
60"	TKLG-245	TKLG-305	TKLG-365
72"	TKLG-246	TKLG-306	TKLG-366
84"	TKLG-247	TKLG-307	TKLG-367
96"	TKLG-248	TKLG-308	TKLG-368
108"	TKLG-249	TKLG-309	TKLG-369
120"	TKLG-2410	TKLG-3010	TKLG-3610
132"	TKLG-2411	TKLG-3011	TKLG-3611
144"	TKLG-2412	TKLG-3012	TKLG-3612



Create Your Own Efficient Workstation with the Available Standard Accessories (Visit Section K)



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TEXAS Fax: (972) 932-4795

NEVADA

Fax: (775) 972-1578

DETAILS and SPECIFICATIONS

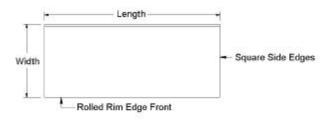
ALL DIMENSIONS ARE TYPICAL TOL ± .500"

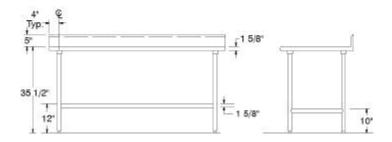
All Units Shipped Unassembled (KD) for Reduced Shipping Costs.

TKSS & TKLG Series Open Base Style 5" Backsplash



Units 8ft. and larger are furnished with six (6) legs





TKSS-Series: Stainless Steel Legs & Stretchers

L	24" Wide	Wt.	30" Wide	Wt.	36" Wide	Wt.
30"	TKSS-240	49 lbs.	TKSS-300	55 lbs.		
24"	TKSS-242	43 lbs.	TKSS-302	48 lbs.		
36"	TKSS-243	55 lbs.	TKSS-303	62 lbs.	TKSS-363	80 lbs.
48"	TKSS-244	67 lbs.	TKSS-304	75 lbs.	TKSS-364	85 lbs.
60"	TKSS-245	77 lbs.	TKSS-305	89 lbs.	TKSS-365	99 lbs.
72"	TKSS-246	89 lbs.	TKSS-306	97 lbs.	TKSS-366	112 lbs.
84"	TKSS-247	107 lbs.	TKSS-307	118 lbs.	TKSS-367	131 lbs.
96"	TKSS-248	119 lbs.	TKSS-308	131 lbs.	TKSS-368	145 lbs.
108"	TKSS-249	135 lbs.	TKSS-309	150 lbs.	TKSS-369	165 lbs.
120"	TKSS-2410	234 lbs.	TKSS-3010	249 lbs.	TKSS-3610	268 lbs.
132"	TKSS-2411	258 lbs.	TKSS-3011	276 lbs.	TKSS-3611	298 lbs.
144"	TKSS-2412	273 lbs.	TKSS-3012	291 lbs.	TKSS-3612	313 lbs.

TKLG-Series: Galvanized Steel Legs & Stretchers

L	24" Wide	Wt.	30" Wide	Wt.	36" Wide	Wt.
30"	TKLG-240	49 lbs.	TKLG-300	55 lbs.		
24"	TKLG-242	43 lbs.	TKLG-302	48 lbs.		
36"	TKLG-243	55 lbs.	TKLG-303	62 lbs.	TKLG-363	80 lbs.
48"	TKLG-244	67 lbs.	TKLG-304	75 lbs.	TKLG-364	85 lbs.
60"	TKLG-245	77 lbs.	TKLG-305	89 lbs.	TKLG-365	99 lbs.
72"	TKLG-246	89 lbs.	TKLG-306	97 lbs.	TKLG-366	112 lbs.
84"	TKLG-247	107 lbs.	TKLG-307	118 lbs.	TKLG-367	131 lbs.
96"	TKLG-248	119 lbs.	TKLG-308	131 lbs.	TKLG-368	145 lbs.
108"	TKLG-249	135 lbs.	TKLG-309	150 lbs.	TKLG-369	165 lbs.
120"	TKLG-2410	234 lbs.	TKLG-3010	249 lbs.	TKLG-3610	268 lbs.
132"	TKLG-2411	258 lbs.	TKLG-3011	276 lbs.	TKLG-3611	298 lbs.
144"	TKLG-2412	273 lbs.	TKLG-3012	291 lbs.	TKLG-3612	313 lbs.



ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.



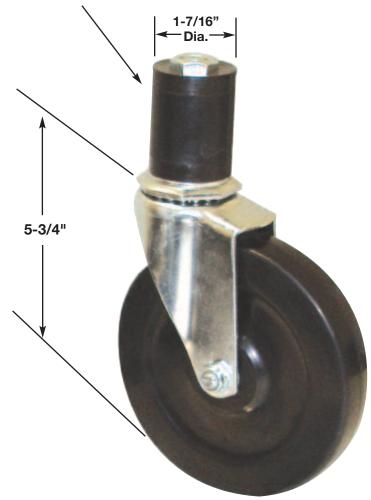
ACCESSORIES - EXPLODED VIEW Model: TA-25 Rubber Casters

EACH SET CONSISTS OF 2 CASTERS WITH BRAKE AND 2 CASTERS WITHOUT

TA-25A Available for Set of 6 Casters: 3 with Brakes, 3 without TA-25B Upgrade Available for Brakes on ALL Casters

3/4" Hex Nut - 1/2-13 Thread

Expanding Adapter For 1-5/8" Dia. O.D. Tube





5" Dia. x 15/16" Thread Width.
Black, Hard Rubber, DELRIN Bearing Wheel

125 LBS. CAPACITY EACH - TEMPERATURE RANGE = 30° - 160° F

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ALL WELDED STAINLESS STEEL SHELVING

TABLE MOUNTED



Fax: (775) 972-1578





Double Deck Table Mounted Shelf Specify location. Front, Center or Rear.

For 18" Wide Shelves, See PT Shelving

Item #:	Qty #:
<i>Model #:</i>	
Project #:	

SINGLE DECK

L	10" Wide	Wt	12" Wide	Wt	15" Wide	Wt
36"	OTS-10-36	17 lbs	OTS-12-36	20 lbs.	OTS-15-36	24 lbs.
48"	OTS-10-48	20 lbs	OTS-12-48	25 lbs.	OTS-15-48	25 lbs.
60"	OTS-10-60	24 lbs	OTS-12-60	31 lbs.	OTS-15-60	31 lbs.
72"	OTS-10-72	29 lbs	OTS-12-72	37 lbs.	OTS-15-72	37 lbs.
84"	OTS-10-84	35 lbs	OTS-12-84	43 lbs.	OTS-15-84	43 lbs.
96"	OTS-10-96	41 lbs	OTS-12-96	50 lbs.	OTS-15-96	50 lbs.
108"	OTS-10-108	49 lbs	OTS-12-108	59 lbs.	OTS-15-108	59 lbs.
120"	OTS-10-120	57 lbs	OTS-12-120	68 lbs.	OTS-15-120	68 lbs.
132"	OTS-10-132	68 lbs	OTS-12-132	82 lbs.	OTS-15-132	82 lbs.
144"	OTS-10-144	79 lbs	OTS-12-144	98 lbs.	OTS-15-144	98 lbs.

Units 8 ft. and larger are furnished with three (3) sets of tubing supports.

For 1" Rear Turn Up, add "R" after model # (Example: OTS-12-60R)

DOUBLE DECK

L	10" Wide	Wt	12" Wide	Wt	15" Wide	Wt
36"	ODS-10-36	28 lbs.	ODS-12-36	32 lbs.	ODS-15-36	37 lbs.
48"	ODS-10-48	36 lbs.	ODS-12-48	40 lbs.	ODS-15-48	44 lbs.
60"	ODS-10-60	45 lbs.	ODS-12-60	50 lbs.	ODS-15-60	55 lbs.
72"	ODS-10-72	54 lbs.	ODS-12-72	60 lbs.	ODS-15-72	66 lbs.
84"	ODS-10-84	63 lbs.	ODS-12-84	70 lbs.	ODS-15-84	77 lbs.
96"	ODS-10-96	72 lbs.	ODS-12-96	80 lbs.	ODS-15-96	88 lbs.
108"	ODS-10-108	81 lbs.	ODS-12-108	90 lbs.	ODS-15-108	99 lbs.
120"	ODS-10-120	90 lbs.	ODS-12-120	101 lbs.	ODS-15-120	110 lbs.
132"	ODS-10-132	102 lbs.	ODS-12-132	112 lbs.	ODS-15-132	121 lbs.
144"	ODS-10-144	114 lbs.	ODS-12-144	121 lbs.	ODS-15-144	132 lbs.

Units 8 ft. and larger are furnished with three (3) sets of tubing supports.

For 1" Rear Turn Up, add "R" after model # (Example: ODS-12-60R)

FEATURES:

All welded stainless steel shelving.

Stainless steel legs: 10" & 12" wide - 1" tubing.

15" wide - 1-5/8" tubing.

Shelves have front & rear rolled edges and sides have square edges.

CONSTRUCTION:

www.advancetabco.com

All TIG welded.

Exposed surfaces polished to a satin finish.

MATERIAL:

All Shelves are 18 gauge type "430" stainless steel.

Holes are required in Table Top.

MODIFICATIONS:

Use TA-47 for special mounting hardware to easily add to existing tables. (for special modifications, consult factory)

Use TA-99 for 16 Gauge, 304 Stainless Steel Upgrade.

Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

Email Orders To: customer@advancetabco.com. For Smart Fabrication™ Quotes, Email To: smartfab@advancetabco.com or Fax To: 631-586-2933

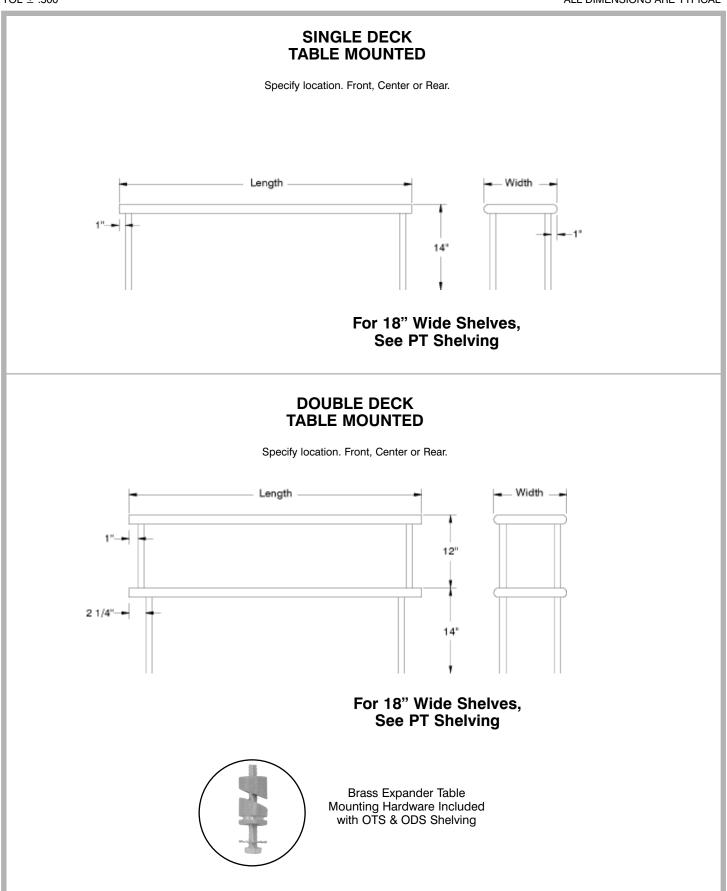
ADVANCE TABCO₈ **NEW YORK GEORGIA TEXAS NEVADA** Fax: (631) 242-6900 Fax: (972) 932-4795

Graceland/Holabird Page: 41

Fax: (770) 775-5625

DETAILS and SPECIFICATIONS

TOL ± .500" ALL DIMENSIONS ARE TYPICAL



02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 14 - HOT FOOD HOLDING CABINET (2 EA REQ'D)

Metro C599-SDS-U

C5™ 9 Series Controlled Humidity Heated Holding & Proofing Cabinet, mobile, full height, insulated solid Dutch doors, universal wire slides, capacity (17) 18" x 26" or (34) 12" x 20" x 2-1/2" pans, 3" O.C. (adjustable on 1-1/2" increments), stainless steel, 5" casters, polymer bumper & drip trough combination, 120v/60/1-PH, 2000 watts, 16 amps, NEMA 5-20P, cULus, NSF, ENERGY STAR®

Item #	

Job

Metro C5 9 Series Controlled Humidity Heated Holding and Proofing Cabinet

- Control: The intuitive 9 Series solid state controller provides continuous monitoring of both temperature and humidity. providing accurate control over the internal environment of the cabinet, resulting in better food quality. Actual temperature and relative humidity are measured, displayed, and controlled.
- Performance: Rapid heat-up and recovery times, and precise humidity control, are achieved with a digitally controlled dual-element ducted heating and humidity system. Intelligent power distribution maximizes efficiency and assures food is held at the desired temperature. Low water sensor and low temperature alarm assure cabinet is performing safely.
- Temperature Priority: The C5 9 Series controller prioritizes heat generation over humidity generation assuring the cabinet holds food at the desired temperature, promoting food safety.
- Configurations:
- Sizes: Full Height, ³/₄ Height, ¹/₂ Height, and Under Counter.
- Doors: Full Length Solid, Full Length Clear, Dutch Solid, Dutch Clear. All are lift off and field reversible.
- Reach-In or Pass-Thru (not available on under counter and 3/4 height).
- Materials: Stainless Steel and Aluminum.
- Capacity: Universal slides hold 18"x26" sheet pans or 12"x20" steam table pans on adjustable 11/2" increments. Lip load slides hold 18"x26" sheet pans on 11/2" increments. Optional Wire Shelf interfaces with universal slide system to accommodate small items and pans.
- Reliability: Reliability and durability are designed into C5 from the ground up. High-quality components and robust construction provide a long life of service and worry-free use.
- Top-Mounted Controls: Ergonomic user-friendly controls are mounted at the top of the cabinet for easier access, better readability, to prevent damage, and to simplify cleaning.
- NAFEM Data Protocol: The C5 controller is NDP capable.
- ENERGY STAR: Full Height, 3/4 Height, and 1/2 Height Stainless Steel reach-in models with solid doors are ENERGY STAR rated.

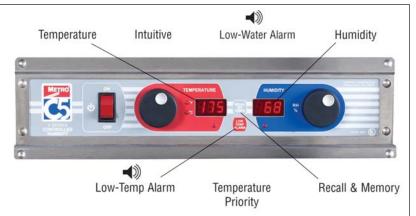




9 Series Controller:

- Temperature: Measures & displays actual cabinet temperature
- Intuitive: Easy-to-use controls that anyone can understand.
- Humidity: Measures and displays actual
- cabinet relative humidity.

 Temperature Priority: 9 Series controller generates heat before humidity for food safety.
- Low-Water Alarm: A safety feature that indicates when water is needed. Water element will not be energized when water is low.
- Low-Temp Alarm: Assures cabinet is operating at desired temperature.
- Recall & Memory: View settings at the touch of a button. Settings are saved when turned off.





InterMetro Industries Corporation

North Washington Street Wilkes-Barre, PA 18705 www.metro.com

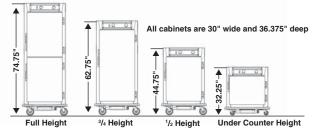




Metro

Metro C5 9 Series Controlled Humidity Heated Holding and Proofing Cabinet

Specifications



- Cabinet Material: Type 304 stainless steel; 20-gauge polished exterior; 22-gauge interior, or .063" aluminum, brushed exterior, natural interior.
- Insulation: Full perimeter, 2.5" thick, high-density fiberglass. R Value=9.9
- Casters: Four casters with 5" donut neoprene wheel, double ball bearing swivel, ball bearing axle, nickel plated, two with brake. 3" rubber casters on Under Counter models.

• Doors:

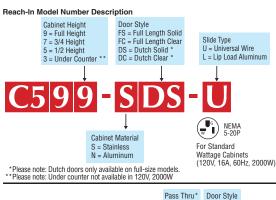
- Solid doors are fully insulated, double-panel construction.
- Clear doors are double-pane, tempered glass. Argon filled with Low-E coating.
- Hinges: Self-closing, lift-off, double hinged, with long-life nylon bearings.
- Gaskets: High temperature, cabinet mounted, Santoprene gaskets.
- Latches: Chrome plated, high-strength magnetic pull latch with leveraction release.
- Handles: Four built-in polymer handles.
- Universal Slides: Universal wire slides; ¹/₄" diameter nickel-chrome wire adjustable on 1¹/₂" increments. Type 304, stainless steel vertical standards.
- Lip Load Slides: 1¹/₂"x¹/₂"x.063" extruded aluminum channel slides on .063" aluminum vertical standards.
- Bumper/Drip Trough: Non-marking polymer bumper and drip trough combination.
- **Display and Controls:** Actual cabinet temperature and relative humidity display with individual control dials for each.
- Heat Generation System: Thermostatically controlled closed loop feedback with 1950 Watt heating element, ball bearing blower motor, and ducted air system. Low temperature alarm enable/disable.
- Cord: 7¹/₂¹ cord with NEMA 5-20P plug. Cord mounted on top (Full, ³/₄, Pass Thru) or back (¹/₂, Under Counter) can be field reversed.
- Humidity Generation System: Closed loop controlled 1950 Watt heating element with ducted air system, low water sensor, and 4½ gallon water reservoir (filled to ½" from top) with drain.
- •Thermal Performance: 200° F maximum temperature.
- Humidity Performance: Up to 95% RH at 100° F, 90% RH at 160° F, or 75% RH at 200° F (Full-Height model).
- Recommended Clearances for Enclosures: 11/2" clearance from cabinet walls on sides and back, and 6" clearance on top. Minimum 1/2" clearance above under counter units is required.
- Slide Capacities:

	Uni	versal W	ire Pan Ca	Lip Load Pan Capacity	
Cabinet Size	Slide P Provided	airs Max.*	18"x26"	12"x20"x2.5" GN 1/1	18"x26"
Full Height	18	37	18	34	35
Full Height Dutch	18	35	17	32	34
³/ ₄ Height	14	29	13	26	27
1/2 Height	8	17	8	16	17
Under Counter	5	10	5	10	10

*Maximum number of slide pairs @ 11/2" spacing. Additional slide pairs ordered separately.

**Capacity based on standard number of slides provided.

All Metro Catalog Sheets are available on our website: www.metro.com



Pass-Thru Model Number Description

C5 9 9 - S DS - U P DS

*Please note: Pass-Thru is only available on Full and ½ Height Models

C5 9 9 L - S DS - U

NEMA 5-15P Add "L" for Lower Wattage Cabinets (120V, 12A, 60Hz, 1440W)

Item #14

C5 9 9 X - S DS - U

Add "X" for Export Cabinets (220-240V, 7.6-8.3A, 50/60Hz, 1681-2000W)



An "A" suffix indicates that accessories need to be factory assembled to the cabinet. Order accessories separately.

Options/Accessories:

- Small Item Shelf (C5-SHELF-S)
- Universal Slide Pair, chrome (C5-USLIDEPR-C)
- Universal Slide Pair, stainless (C5-USLIDEPR-S)
- Flush Door Latch (C5-LATCHFLUSH)*
- Key Locking Door Latch (C5-LATCHLOCK)*
- Twist Locking Door Latch (C5-LATCHTWST)*
- Full Perimeter Bumper (C5-PERMBUMP)
- Control Panel Cover (C5-COVER)
- Drain Hose Adapter (C5-HOSEADPT)
- Rear Push Handle (C5-HANDLE)
- 6" Stainless Steel Legs (C5-SSLEGS)
- 6" Casters (C5-6CASTER)
- 5" Rear Rigid Casters (C5-5RDGCSTR)
- Straight Plug, 20 Amp, 120V (C5-STRPLG-20)
- Straight Plug, 15 Amp, 120V (C5-STRPLG-15)
- Twist Lock Plug, 20 Amp, 120V (C5-RTWSTPLG)
- Twist Lock Plug, 15 Amp, 120V (C5-RTWSTPLG-15)
- Factory Left Hand Hinging (DD3768)
- Factory Same-Side Pass-thru Door Hinging (C5-SAMESIDE)
- Stainless Steel Universal Slide Upgrades
 - Full Height (C5-USLIDE-9S)
 - 34 Height (C5-USLIDE-7S)
 - ½ Height (C5-USLIDE-5S)
 - Under Counter (C5-USLIDE-3S)

Please note: (1) door latch must be ordered for each door (i.e.- dutch doors require (2) door latches; pass-thru dutch doors require (4) door latches)

Metro Heated cabinets are for hot food holding applications only.



InterMetro Industries Corporation

North Washington Street • Wilkes-Barre, PA 18705 • 570.825.2741 Fax: 800.638.9263 (East Coast/Canada) • Fax: 800.638.3292 (West Coast)

FOR PRODUCT INFORMATION/CUSTOMER SERVICE:

U.S./Canada/Latin America: 1.800.992.1776 • Europe: +31.76.587.7550 Asia/Pacific: +65.6567.8003 • Middle East/Africa: +971.4.811.8286

Information and specifications are subject to change without notice. Please confirm at time of order

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L03-258 Rev. 02/12

Printed in U.S.A.

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 15 - CEILING HUNG CORD REEL (4 EA REQ'D)

Custom HOPKINS CORD REEL

Cable, Cord and Hose Reels

Industrial Cord Reels





HBL45123TL20

Industrial Power Cord Reels

Cord End	NEMA Style	Cable Feet (m)	Volts AC	Cable Type	Amps	Weight Lbs. (kg)	Catalog Number
HBL5269C Connector.	5-15R	45 (13.7)	125	12/3 SJEO	15	23 (10.4)	HBL45123C
HBL5369C Connector.	5-20R	45 (13.7)	125	12/3 SJEO	20	23 (10.4)	HBL45123C20
HBL2313 Connector.	L5-20R	45 (13.7)	125	12/3 SJEO	20	28 (12.7)	HBL45123TL20
HBL2313 Connector white reel housing).	L5-20R	45 (13.7)	125	12/3 SJEO	20	28 (12.7)	HBL45123TL20W
Portable Outlet Box with (1) gray duplex	5-15R	45 (13.7)	125	12/3 SJEO	15	29 (13.2)	HBL45123R
eceptacle.	5-20R	45 (13.7)	125	12/3 SJEO	20	29 (13.2)	HBL45123R20
Portable Outlet Box with (1) ground fault	5-15R	45 (13.7)	125	12/3 SJEO	15	29 (13.2)	HBL45123GF15
protected gray duplex receptacle.	5-20R	45 (13.7)	125	12/3 SJEO	20	29 (13.2)	HBL45123GF20
Pivot Base 330° Rotation fits all industrial models.	-	-	-	-	-	5 (2.3)	HBL340PB
Replacement stop.	_	_	_	_	_	.2 (.09)	HBL12BS

Notes: 15 Amp: Supplied with 5 ft. power supply card with HBL5266C, 15A straight blade plug. 20 Amp: Supplied with 5 ft. power supply cord with HBL5366C, 20A straight blade plug. Ground fault protected reels supplied with (1) GFM20 and (1) HBLP26FS.

HBL45123C

HBL45123R

Industrial Light Cord Reels

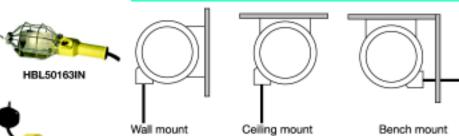
	Watts	Cable	Volts	Cable		Weight	
Cord End	(Max)	Feet (m)	AC	Type	Amps	Lbs. (kg)	Catalog Number
Incandescent Hand Lamp.	100	50 (15.2)	125	16/3	8.0	21 (9.5)	HBL50163IN
Fluorescent Hand Lamp.	13	50 (15.2)	120	16/2	0.3	21 (9.5)	HBL50162FL
Pivot Base 330° Rotation	_	_	_	_	_	5 (2.3)	HBL340PB
fits all industrial models.							
Replacement stop.	_	_	_	_	_	.2 (.09)	HBL16BS

Note: Supplied with 5 ft. power supply cord with HBL5266C, 15A straight blade plug.



HBL45123TL20

Three Mounting Positions



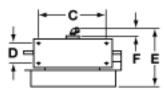


Dim	ensi	ons
Inch	(mm)	Α

Inch (mm) A	В	С	D	E	F	
13.00° (330)	12.38° (314)	8.00° (203)	2.50° (64)	9.75° (248)	1.25"	







Listings/Certifications

UL 355 CSA C22.2 No. 21.

Environment

Dry, indoor, non-hazardous locations.





All models have four 5% diameter mounting holes.

R-4



Wiring Device-Kellems

www.hubbell-wiring.com

Dimensions in Inches (mm)

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 16 - HAND SINK (4 EA REQ'D)

Advance Tabco 7-PS-62

Hand Sink, wall model, 14" wide x 10" front-to-back x 5" deep bowl, 20 gauge 304 series stainless steel, splash mounted gooseneck faucet, knee valve, basket drain, wall bracket, NSF, cCSAus

ACCESSORIES

Mfr	Qty	Model	Spec
Advance Tabco	4		Note: This faucet complies with 2014 Federal no lead standards
Advance Tabco	4	K-08	Low-flow aerator 0.5gpm, fits 55/64-27 male or 15/16-27 female thread on spout, conforms to California AB 1953



STAINLESS STEEL

HAND SINKS **KNEE VALVE**







SPACE SAVER



See page A-7 for more Space Saver Units







7-PS-78

Keyhole Bracket for easier installation and greater stability.





Item #: _____ Otv #: ____ Model #:____ **Project** #:_____

FEATURES:

One piece Deep Drawn sink bowl design.

7-PS-30 Sink bowl is 16" x 14" x 6".

7-PS-78 Sink bowl is 16" x 20" x 6".

7-PS-62 & 7-PS-82 Sink bowl is 10" x 14" x 5".

7-PS-63 Sink bowl is 9" x 9" x 5".

Keyhole wall mount bracket.

Stainless steel basket drain 1-1/2" IPS.

Knee valve operated faucet provides true hands-free operation.

All sink bowls have a large liberal radii with a minimum dimension of 2" and are rectangular in design for increased capacity.

Apron conceals plumbing on all three sides.

"Hands Free" splash mounted gooseneck faucet furnished with aerator.

Specific Features:

7-PS-82 has Towel Dispenser with hinged towel box. Unit uses standard C-fold towels. Liquid soap dispenser also included.

7-PS-63 "Hands Free" splash mounted 6" "D" Spout faucet furnished with aerator.

CONSTRUCTION:

All TIG welded.

Welded areas blended to match adjacent surfaces and to a satin finish. Die formed Countertop Edge with a 3/8" No-Drip offset.

One sheet of stainless steel - No Seams.

MATERIAL:

Heavy gauge type 304 series stainless steel.

Wall mounting bracket is galvanized steel and of offset design.

All fittings are brass / chrome plated unless otherwise indicated.

MECHANICAL:

Spout supply is 1/2" IPS male thread.

Knee Valve is barrel type and is activated by pedal.

(Contractor on site must connect faucet to knee operated valves.)

Standard Faucet conforms to NSF 61 Standard 9. Faucets Are AB1953 Lead Free Compliant.

For Replacement Faucets & Upgrades, Drains & Accessories Visit our website at www.advancetabco.com



Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

For Orders & Customer Service:

Email: customer@advancetabco.com or Fax: 631-242-6900

For Smart Fabrication™ Quotes:

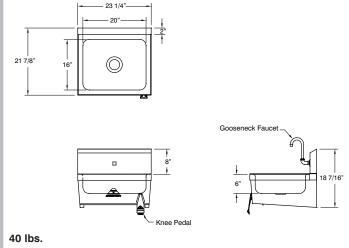
Email: smartfab@advancetabco.com or Fax: 631-586-2933

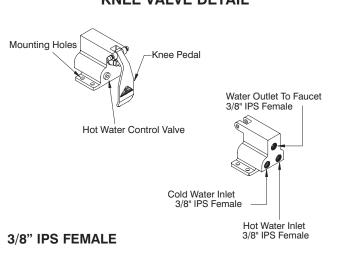
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REF-B

Graceland/Holabird

ENSIONS and SPECIFICATIONS FITTINGS SUPPLIED AS SHOWN ALL DIMENSIONS ARE TYPICAL TOL Overall: ± .500" Interior: ± .250" 17 1/4" 7-PS-62 7-PS-82 -17 1/4"-15 1/4 15 1/4" 10" Soap Dispenser Towel Dispenser Gooseneck Faucet Gooseneck Faucet 30 5/8" 17 1/4" iiii m 38 lbs. 25 lbs. Knee Valve Knee Valve 7-PS-30 7-PS-63 12 1/4" 17 1/4" - 14" 16" 21 1/4" 16" "D" Spout -8 5/8"-Faucet Gooseneck 16 1/8" 17 1/4" W W `006 ``W Knee Valve 33 lbs. Knee Valve 20 lbs. 7-PS-78 **KNEE VALVE DETAIL** 23 1/4 Mounting Holes Knee Pedal 21 7/8 16







ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.

SIDE SPLASHES FOR HAND SINKS

Welded



7-3/4" High Welded Side Splashes

ONE SIDE SPLASH	TWO SIDE SPLASHES		
Model #	Model #	Description	
7-PS-16	7-PS-17	Units w/ 10" x 14" Bowl & Splash Mount Faucet	
7-PS-16A	7-PS-17A	Units w/ 9" x 9" Bowls	
7-PS-16B	7-PS-17B	Units w/ 10" x 14" Bowl & Deck Mount Faucet	
7-PS-16C	7-PS-17C	Units w/ 16" x 20" Bowls	
7-PS-16D	7-PS-17D	For Handicapped Hand Sinks	
7-PS-16E	7-PS-17E	Units w/ 14" (F/B) x 16" Bowls	
7-PS-16F	7-PS-17F	Units w/ 16" x 14" Bowls	

12" High Welded Side Splashes

ONE SIDE SPLASH	TWO SIDE SPLASHES		
Model #	Model #	Description	
7-PS-11	7-PS-15	Units w/ 10" x 14" Bowl & Splash Mount Faucet	
7-PS-11A	7-PS-15A	Units w/ 9" x 9" Bowls	
7-PS-11B	7-PS-15B	Units w/ 10" x 14" Bowl & Deck Mount Faucet	
7-PS-11C	7-PS-15C	Units w/ 16" x 20" Bowls	
7-PS-11D	7-PS-15D	For Handicapped Hand Sinks	
7-PS-11E	7-PS-15E	Units w/ 14" (F/B) x 16" Bowls	
7-PS-11F	7-PS-15F	Units w/ 16" (F/B) x 14" Bowls	

Bolted



Includes Holes. Hardware not included

7-3/4" High Bolted Side Splashes

ONE SIDE SPLASH

Model #	Description
7-PS-27	Units w/ 10" x 14" Bowl & Splash Mount Faucet
7-PS-27A	Units w/ 9" x 9" Bowls
7-PS-27B	Units w/ 10" x 14" Bowl & Deck Mount Faucet
7-PS-27C	Units w/ 16" x 20" Bowls
7-PS-27D	For Handicapped Hand Sinks
7-PS-27E	Units w/ 14" (F/B) x 16" Bowls
7-PS-27F	Units w/ 16" (F/B) x 14" Bowls

Plastic

Replacement Handles 7-PS-38

$Pedestal \ Bases \ \ {\it For use with 10" x 14" Hand Sink Bowls*} \ \ ({\it Sinks Not Included})$







Basic Pedestal Base 7-PS-37

*Pedestal Base For 7-PS-20 and 7-PS-20-NF Hand Sinks 7-PS-37B



Add Trash Receptacle For 7-PS-33, 7-PS-37 or 7-PS-37B Only

7-PS-29

Instant Hot Water on Demand

This unit allows for hand sinks to be installed in remote areas with just a cold water supply and available 30 amp electric power.

There is no delay or wasted water while waiting for hot water to reach the faucet.

Includes Heater & Plumbing Hardware

7-PS-92



Tubular Wall Supports



MODEL# **DESCRIPTION** 7-PS-24 Units with 10"x14" Bowl and Splash Mounted Faucet 7-PS-24B Units with 10"x14" Bowl and Deck Mounted Faucet 7-PS-24C Units with 16"x14" & 16"x20" Bowls

Side Mounting Wall Brackets For Added Strength

7-PS-36

(includes 2 brackets (Add to price of sink)



Skirt Assembly For Support

7-PS-31

7-PS-31A

7-PS-31B

Fits Hand Sinks with 10" x 14" Bowl and Splash Mounted Faucets

Fits Hand Sinks with 9" x 9" Bowl Only

Fits Hand Sinks with 10" x 14" Bowl and Deck Mounted Faucets

Mirror Highlite Edge For Hand Sinks 7-PS-106



C-Fold Style Paper Towel & Soap Dispenser

Mounts On 17" Wide Hand Sinks Only

7-PS-34



7-PS-35



Wall Mounted Paper

Towel Dispenser

Removable Utility Tray for Side Splashes

- 8" x 3" x 2 5/16" Tray.
- Tray hem allows to hang from any standard side splash.
- · Perforated for water drainage.

7-PS-48



Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

For Orders & Customer Service: Email: customer@advancetabco.com or Fax: 631-242-6900

For Smart Fabrication™ Quotes: Email: smartfab@advancetabco.com or Fax: 631-586-2933



HAND SINK FAUCETS & SPOUTS

All Faucets Meet 2014 Federal Lead Free Standards



3-1/2" Splash Mounted **Faucet** K-59 4" O.C.

3-1/2" Splash **Mounted Faucet** with Wrist Handles K-316 4" O.C.



3-1/2" Splash Mt. Gooseneck Spout

Deck Mounted Faucet



Splash Mt. w/

Wrist Handles

K-22

for Faucets K-316-LU

Deck Mt. 6"

Extended Spout



ELECTRONIC HANDS FREE FAUCETS



Deck Mt. K-180

Replacement **Control Module**



Infra-Red Sensor and Wire Assembly







Deck Mt. w/

Wrist Handles



K-12

K-123

Splash Mt. 6"

Extended Spout



SPECIALTY FAUCETS & ADAPTERS

Slow-Released **Metered Faucet**







Wand K-400

Hands-Free



Spout not included

Low Flow **Aerator** K-08



.5 GPM

REPAIR KITS

Splash Mt.

K-175

Repair Kit for K-22, K-50, K-52 and K-59 K-00



Punch for Single Hole Deck Mt. Faucet

Faucet Not Included K-71



Punch for 8" O.C. **Faucet Holes**

K-70

STANDARD HAND SINK REPLACEMENT FAUCETS

Model	Spout Size/Style	For Faucet Model
K-52SP	3-1/2" Swivel Gooseneck	K-52
K-59SP	3-1/2" Swivel Gooseneck	K-59
K-208SP	6" Extended Swivel Gooseneck	K-208
K-175SP	4-1/2" Gooseneck	K-175

DRAINS & P-TRAPS

Chrome Plated P-Traps

7-PS-14



7-PS-10

Standard **Heavy Duty** 22 Gauge 17 Gauge

Lever Drain with P-Trap & Overflow



Lever Drain Only P-Trap & Overflow Not Included





BASKET DRAINS & STRAINERS



1-1/2" IPS



Replacement Drain Basket For K-6 K-310







2" Drain Assembly w/ Strainer Plate K-63

for 3-1/2" Drain

for 2" Drain K-411

PEDALS & KNEE VALVES

Knee Valve Assembly

w/ Mounting Bracket



Combo. H/C Single Pedal



Knee Valve Replacement K-104



Replacement Bonnet for Pedal/Knee Valve (K-103 & K-104, 7-PS-32 & 7-PS-39

K-01

Thermostatic Mixing Valve K-425



Wall Mount 7-PS-12



SOAP DISPENSERS

Wall Mount K-13





ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 17 - TWO (2) COMPARTMENT SINK (1 EA REQ'D)

Aero 2F2-2116-24LR

Aerospec™ Sink, two compartment, 83"W x 27"D x 42-1/2"H, 14/304 stainless steel construction, (2) 16"W x 21" front-to-back x 14" deep fabricated compartments, 24" drainboards on left & right, 10"H backsplash, 8" O.C. splash mount faucet holes, raised rolled edges on front & sides, fully welded stainless steel gussets, 16/304 stainless steel legs with front & side cross bracing, adjustable stainless steel feet, Aero Hemmed Safety Edge™, KD, NSF ACCESSORIES

Mfr	Qty	Model	Spec
T&S Brass	1	B-0597	Pot Filler Faucet, splash mount, 8" centers, double-jointed, 18"L, with insulated off-on control valve at outlet, 1/2" IPS female inlet



NSF SINKS

Project

F2LR SERIES, Two Compartment with Two Drainboards

Item#



MATERIAL

BODY

- MF –16 gauge 304 stainless steel bowl, 430 body.
- 3F -16 gauge 304 stainless steel.
- 2F -14 gauge 304 stainless steel. (AEROSPEC)

LEGS

■ 1%" O.D. 16 gauge 304 series stainless steel tubing, complete with 1" adjustable impact resistant white metal feet.

DESIGN FEATURES

- All sinks are fully cartoned.
- Easily assembled.
- Drainboards pitched ¾" for positive drainage.

EXCLUSIVE AERO SAFETY EDGE

 Sink hemmed on the roll and backsplash to eliminate cuts from rough edges.

CONSTRUCTION

- Exclusive 14" bowl depth on all models (consultant's spec).
- Custom style fabricated bowl for true gauge integrity.
- All sinks have a ¾" radius at all intersecting planes (consultant's spec).
- 18 gauge stainless steel strip to cover seams between bowls.
- Stainless steel gusset is machine welded 360 deg. to a stainless steel triangular plate.
- Gusset plate is fully welded directly underneath the sink for support.
- Polished to a #4 blended finish.
- All sinks with drainboards 30" or longer equipped with 2 stainless steel 1%" O.D. legs with stainless steel gussets and white metal feet.

PLUMBING

- Water supply is ½" hot and cold.
- Faucet holes are 8" o.c. (Faucets not included. See accessories).

AEROSPEC

Includes all of the above and the following:

- Full 10" backsplash instead of standard 7".
- 18 gauge stainless steel enclosure surrounding all sink bowls.
- Stainless steel feet in lieu of white metal.
- Legs have stainless steel crossbracing with aluminum castings at all intersections.

ECONOMY Quantity MF2 AEROSPEC 2F2 DELUX 3F2 Model # Model # Model # MF2-2116-18LR 3F2-2116-18LR 2F2-2116-18LR 3F2-2116-24LR 3F2-2116-30LR 2F2-2116-24LR 2F2-2116-30LR MF2-2116-24LR MF2-2116-30LR MF2-2116-36LR 3F2-2116-36LR 2F2-2116-36LR NIDE MF2-2020-20LR 3F2-2020-20LR 2F2-2020-20LR MF2-2020-24LR 3F2-2020-24LR 2F2-2020-24LR MF2-2020-30LR 3F2-2020-30LR 2F2-2020-30LR MF2-2020-36LR 3F2-2020-36LR 2F2-2020-36LR VIDE MF2-2418-18LR 3F2-2418-18LR 2F2-2418-18LR MF2-2418-24LR MF2-2418-30LR 3F2-2418-24LR 2F2-2418-24LR 3F2-2418-30LR 2F2-2418-30LR MF2-2418-36LR 3F2-2418-36LR 2F2-2418-36LR WIDE MF2-2424-18LR 3F2-2424-18LR 2F2-2424-18LR MF2-2424-24LR 3F2-2424-24LR 2F2-2424-24LR MF2-2424-30LR 3F2-2424-30LR 2F2-2424-30LR MF2-2424-36LR 3F2-2424-36LR 2F2-2424-36LR WIDE MF2-3020-20LR 3F2-3020-20LR 2F2-3020-20LR MF2-3020-24LR 3F2-3020-24LR 2F2-3020-24LR MF2-3020-30LR 3F2-3020-30LR 2F2-3020-30LR

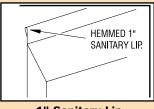
CUSTOM SIZES AVAILABLE

3F2-3020-36LR

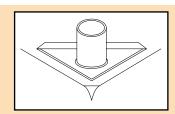
MF2-3020-36LR



Aero Safety Edge



1" Sanitary Lip



2F2-3020-36LR

Fully Welded Gusset Assembly



14" Custom-Style

CONSULTANT'S SPECS AT PRODUCTION PRICES

email - sales@aeromfg.com

AERO MANUFACTURING COMPANY • 310 ALLWOOD ROAD, CLIFTON, NEW JERSEY 07012 • VOICE 973.473.5300 FAX 973.473.3794



DIMENSIONAL SPECIFICATIONS

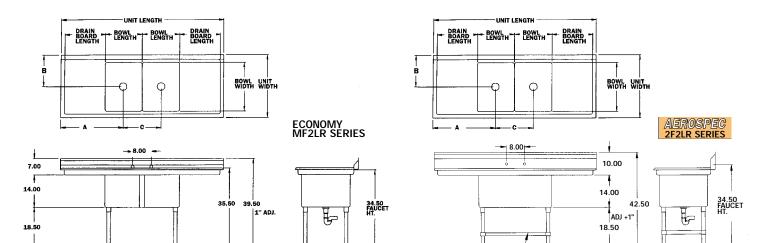
F2LR SERIES, NSF Sinks, Two Compartment, Two Drainboards

ADJ CROSSBRACING



■ Supplied with stainless steel drain basket and strainer.





BOWL Width	BOWL Length	UNIT Width	UNIT Length	DRAIN BOARD Length	A Drain	B Drain	C Drain	ECONOMY MF2 Model #	DELUX 3F2 Model #	AEROSPEC 2F2 Model #	Ship Weight	Cubic Feet	Sets, Faucet Holes
21"	' WID	E											
21 21 21 21	16 16 16 16	27 27 27 27	71 83 95 107	18 24 30 36	27.5 33.5 39.5 45.5	13.75 13.75 13.75 13.75	16 16 16 16	MF2-2116-18LR MF2-2116-24LR MF2-2116-30LR MF2-2116-36LR	3F2-2116-18LR 3F2-2116-24LR 3F2-2116-30LR 3F2-2116-36LR	2F2-2116-18LR 2F2-2116-24LR 2F2-2116-30LR 2F2-2116-36LR	130 140 150 160	23 27 31 35	ONE ONE ONE
20" 20 20 20 20 20	20 20 20 20 20 20	26 26 26 26 26	83 91 103 115	20 24 30 36	31.5 35.5 41.5 47.5	13.25 13.25 13.25 13.25	20 20 20 20	MF2-2020-20LR MF2-2020-24LR MF2-2020-30LR MF2-2020-36LR	3F2-2020-20LR 3F2-2020-24LR 3F2-2020-30LR 3F2-2020-36LR	2F2-2020-20LR 2F2-2020-24LR 2F2-2020-30LR 2F2-2020-36LR	140 150 160 170	27 33 36 40	ONE ONE ONE
24" 24 24 24 24 24	18 18 18 18 18	30 30 30 30 30	75 87 99 111	18 24 30 36	28.5 34.5 40.5 46.5	13.75 13.75 13.75 13.75	18 18 18 18	MF2-2418-18LR MF2-2418-24LR MF2-2418-30LR MF2-2418-36LR	3F2-2418-18LR 3F2-2418-24LR 3F2-2418-30LR 3F2-2418-36LR	2F2-2418-18LR 2F2-2418-24LR 2F2-2418-30LR 2F2-2418-36LR	135 145 155 165	25 29 32 36	ONE ONE ONE ONE
24 24 24 24 24 24	24 24 24 24 24	30 30 30 30 30	87 99 111 123	18 24 30 36	31.5 37.5 43.5 49.5	15.25 15.25 15.25 15.25	24 24 24 24	MF2-2424-18LR MF2-2424-24LR MF2-2424-30LR MF2-2424-36LR	3F2-2424-18LR 3F2-2424-24LR 3F2-2424-30LR 3F2-2424-36LR	2F2-2424-18LR 2F2-2424-24LR 2F2-2424-30LR 2F2-2424-36LR	150 165 175 185	32 36 40 45	ONE ONE ONE ONE
30" 30 30 30 30	20 20 20 20 20 20	36 36 36 36 36	83 91 103 115	18 24 30 36	31.5 35.5 41.5 47.5	18.25 18.25 18.25 18.25	20 20 20 20 20	MF2-3020-20LR MF2-3020-24LR MF2-3020-30LR MF2-3020-36LR	3F2-3020-20LR 3F2-3020-24LR 3F2-3020-30LR 3F2-3020-36LR	2F2-3020-20LR 2F2-3020-24LR 2F2-3020-30LR 2F2-3020-36LR	160 175 185 195	35 40 45 50	ONE ONE ONE ONE



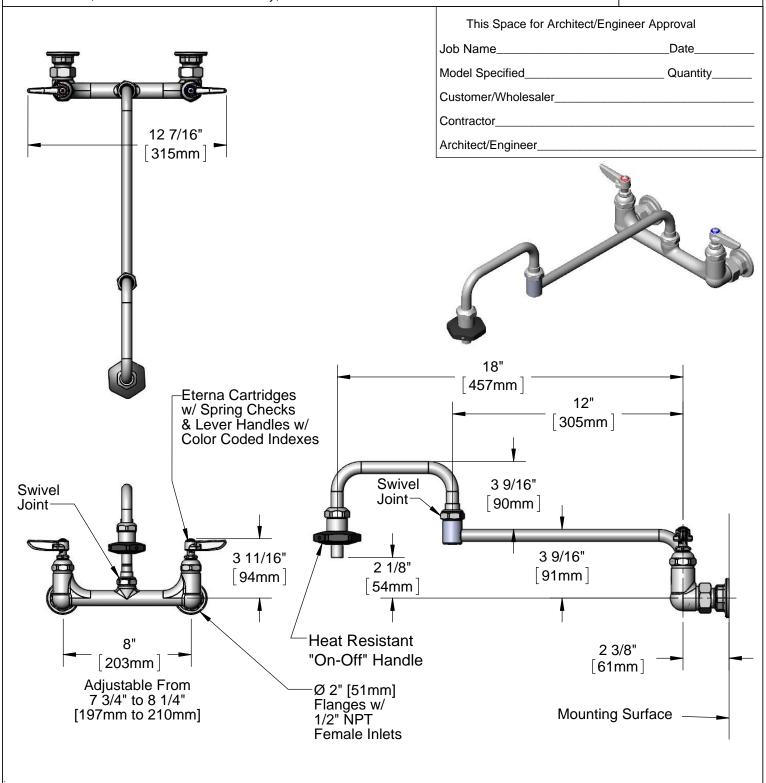
T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088 Travelers Rest, SC 29690 Model No.

B-0597

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com



Product Specifications:

8" Pot Filler Mixing Faucet, Eterna Cartridges w/ Spring Checks, Lever Handles, Single Control w/ 18" Double Joint Swing Nozzle, Heat Resistant Handle & 1/2" NPT Female Inlets

Product Compliance:

ASME A112.18.1 / CSA B125.1 NSF 61 - Section 9 NSF 372 (Low Lead Content)

Drawn: KJG Checked: JRM Approved: JHB Date: 04/300/14 Scale: 1:6 Sheet: 1 of 2



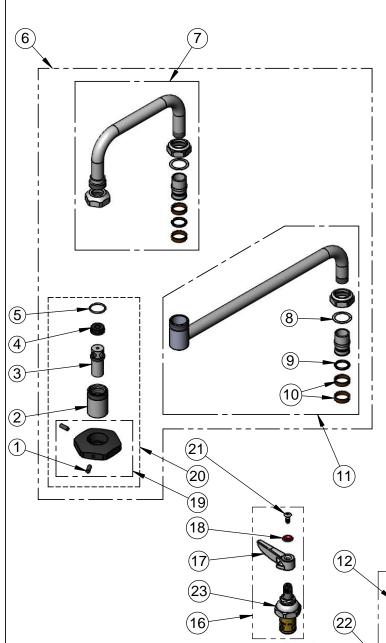
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B-0597

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com



ITEM NO.	SALES NO.	DESCRIPTION		
1	000936-45	Handle Set Screw		
2	000587-25	Spout Body		
3	001498-25	Spout		
4	001089-45	Seal		
5	003426-45	O-Ring		
6	002848-40	18" Double Joint Nozzle		
7	002870-40	6" Front Section		
8	009538-45	Swivel Washer		
9	001074-45	O-Ring		
10	011429-45	Swivel Sleeves (2)		
11	002871-40	12" Back Section		
12	001660-45	Blue Index-CW		
13	002711-40	Eterna Cartridge, LTC w/ Spring Check, Handle, Index & Screw		
14	00AA	1/2" NPT Female Eccentric Flange		
15	001019-45	Coupling Nut Washer		
16	002712-40	Eterna Cartridge, RTC w/ Spring Check, Handle, Index & Screw		
17	001638-45	Lever Handle		
18	001661-45	Red Index-HW		
19	001126-20	Handle w/ (2) Set Screws		
20	035A	Outlet		
21	000922-45	Lever Handle Screw		
22	012442-40	Eterna Cartridge, LTC w/ Spring Check		
23	012443-40	Eterna Cartridge, RTC w/ Spring Check		
9				

Product Specifications:

8" Pot Filler Mixing Faucet, Eterna Cartridges w/ Spring Checks, Lever Handles, Single Control w/ 18" Double Joint Swing Nozzle, Heat Resistant Handle & 1/2" NPT Female Inlets

Product Compliance:

(15)

ASME A112.18.1 / CSA B125.1 NSF 61 - Section 9 NSF 372 (Low Lead Content)

Drawn: KJG Checked: JRM Approved: JHB Date: 04/300/14 Scale: NTS Sheet: 2 of 2

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 18 - WALL GRID STORAGE SHELVING (2 EA REQ'D)

Metro SWK36-1

SmartWall G3 Medium Duty Task Station Starter Unit, consists of (1) SW40K3 wall track (2) SWU30K3 uprights (2) SWS18K3 shelf supports (1) 1836NK3 wire shelf, & (1) WG1836K3 wire grid



Item	#			

Job _____

SmartWall G3 – Starter Kits and Accessory Kits for Task Stations *Organized, efficient wall space at work.*

A unique storage and work station system for often underutilized space – empty walls. SmartWall G3 and its system of integrated wall tracks offer the flexibility to add wall shelving and wall mounted task stations where needed throughout a facility. The use of the system around and above sinks, work tables, and equipment will keep these areas cleaner and more organized. SmartWall G3 can become an integral part of everyday operating processes to improve efficiencies and ultimately the return on investment (ROI).



Keep prep areas organized and clean to promote a safer work environment and greater efficiencies.



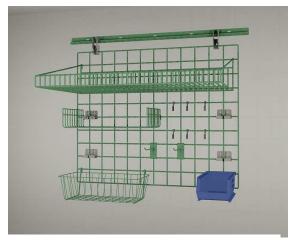
Safely air dry and organize containers, cutting boards, trays, and utensils.

NSF

SmartWall G3 promotes food safety.



Task station (medium duty) configuration with accessories for a prep / wash sink.



Task station (standard duty) configuration with accessories for a food prep area.

*MICROBAN and the MICROBAN symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



InterMetro Industries Corporation North Washington Street Wilkes-Barre, PA 18705 www.metro.com



SmartWall G3™ Starter and Accessory Kits

SmartWall G3



Item #18

Starter Kits and Accessory Packs



Task Station (medium duty) Cat. No. SWK36-1

- Bulk overhead storage space with a 1836NK3 wire shelf
- 18"x36" (457x914mm) grid space
- Multiple cartons

SWK36-1

- 40" (1016mm) track
- Overall dimensions: Length x Height 40" x 31-1/4" (1016 x 793mm)

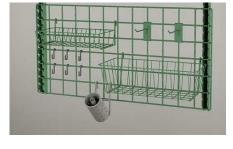
Su	bcomponents	Description	QTY
SW	40K3	wall track	1
SW	'U30K3	upright	2
SW	'S18K3	shelf support	2
183	36NK3	shelf	1
WG	31836K3	grid	1



Task Station (standard duty) Cat. No. SWK36-2

- · Light duty 50 lb. capacity overhead
- 40" (1016mm) track and 30"x36" (762x914mm) grid space
- Multiple cartons
- Overall dimensions: Length x Height 40" x 39-11/16" (1016 x 1008mm)

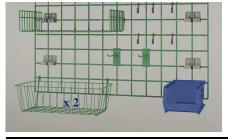
Subcomponents	Description	QTY
SW40K3	wall track	1
SWGB1	grid bracket kit	1
WG3036K3	grid	1
GS1836K3	grid shelf	1



Accessory Pack - Sink Cat. No. SWA1

- Designed to safely air dry lids, cutting boards, and utensils
- Packaged in one carton To fit minimum 18"x36"
- (457x914mm) grid space
- · Grids not included

Description	QTY
wire basket	1
lid holder	1
utensil cylinder	1
cylinder holder	1
prong hook	2
standard hook	6
	wire basket lid holder utensil cylinder cylinder holder prong hook



Accessory Pack - Food Prep Cat. No. SWA2

- · Accessories to manage utensils, extra tools, small ingredients, and wrapping supplies
- Packaged in one carton To fit minimum 18"x36"
- (457x914mm) grid space
- Grids not included

Subcomponents	Description	QTY
PBA-GSDK3	small shelf	1
H210K3	wire basket	2
DD3722A	bin holder	1
MB30230B	small bin	1
PGHK6K3	prong hook	2
HK23C	standard hook	6



InterMetro Industries Corporation

North Washington St. Wilkes-Barre, PA 18705

For Product Information: U.S. and Canada: 1.800.433.2232 Latin America: 1.561.333.3824 Europe: +31(0)76.587.75.50 Asia/Pacific: +65.6567.8003 Middle East/Africa: +971.4.811.8286 L02-182 8/09

Information and specifications are subject to change without notice. Please confirm at the time of

From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 19 - SPARE NO.

<Spare No.>

From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 20 - SPARE NO.

<Spare No.>

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 21 - HOT FOOD SERVING COUNTER (2 EA REQ'D)

Delfield DC-H4

Concepts[™] Heated Serving Counter, Electric, 66" length, (4) 12" x 20" pan capacity, infinite temperature controls, stainless steel top& heated food well, front and rear removable panels, 1/2" drains, wet & dry operation, 6" legs, 208-230v/60/1-ph, cUL, UL, NSF (contact factory for price)

ACCESSORIES

Mfr	Qty	Model	Spec
Delfield	2		NOTE: Freight quotes are only valid from Delfield
Delfield	2		208v/60/1-ph, 20.0 amps, standard
Delfield	2		(1) Year parts & labor, warranty standard

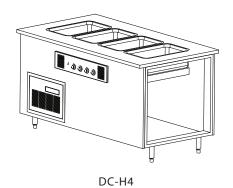
Concepts™ Serving Systems

Heated Serving Counter

Project	
Item	
Quantity	_
CSI Section 11400	
Approved	_
Date	

Models

DC-H2 Heated serving counter, fits two standard 12"x20" pans
 DC-H3 Heated serving counter, fits three standard 12"x20" pans
 DC-H4 Heated serving counter, fits four standard 12"x20" pans
 DC-H5 Heated serving counter, fits five standard 12"x20" pans
 DC-H6 Heated serving counter, fits six standard 12"x20" pans



Standard Features

- Flush mount die stamped stainless steel heated food well
- 1/2" stainless steel drains
- Heavy duty stainless steel top
- Reinforced stainless steel front and rear removable panels
- · Heavy duty base support structure
- · Standard on 6" legs
- · Must be hard wired in field
- 11.87" x 19.87" single hot food wells are manifolded together to one main gate valve
- · Wet and dry operation
- · Individual infinite temperature controls
- · 36" work height
- · One year parts and labor standard warranty

Options & Accessories

- Custom lengths available per inch
- Granite, Hanstone and Solid Surface top materials
- Laminated base panels

- Finished stainless steel or laminated end panels
- Décor panels
- · Graphics packages
- FlexiShield® foodshields
- Signage with overstructures, lights and heatlamps*
- · Refrigerated base inserts*
- Heated base inserts*
- Dry storage base inserts
- Mechanical access doors
- Fixed and adjustable height casters (stand alone units only)
- Kickplates (units with legs only)
- · Adapter plates and bars
- Tray slides
- Omit drains
- Fill faucet
- 30" and 34" work heights
- 220V/50 cycle electrical system*
- Energy saving power well (ESP)*
- Inclusion of this option will alter electrical specifications of the unit

Specifications

Exterior body is constructed of 0.75" Melamine reinforced front and rear panels with 22 gauge stainless steel skin and 1" polyethylene horizontal rib supports. Horizontal brace on rear is constructed of 18 gauge galvanized steel. The exterior ends are unfinished.

Exterior top is constructed of 14 gauge stainless steel. Horizontal top supports on front and rear are constructed with 18 gauge galvanized steel. Top end supports are 12 gauge stainless steel.

Interior base bottom is constructed of 16 gauge galvanized steel. Vertical base support braces are 14 gauge galvanized steel.

Heated food warmers are constructed of die-stamped stainless steel. Heated food warmers are insulated on bottom. Each heated food warmer is individually equipped with a heated element rated at 1000 watts for 120 volt or 208/2300 volt, 60 hertz, single phase service and wired to an adjustable control switch and indicator light in the control panel. Warmers are equipped with a 0.5" stainless steel drain plumbed to the

drain valve located behind the hinged louvered door.

Legs: Bases mounted on 6.12" adjustable legs.

Optional Energy Saving Power wells (ESP) are individually equipped with a heated pad on bottom and sides of well rated at 500 watts for 208-230V or 240V. ESP wells provided with individual solid state digital temperature control wired to one main control panel with 4' of conduit and wire. This option reduces energy usage.





cepts™ Serving Systems: Heated Serving Counte



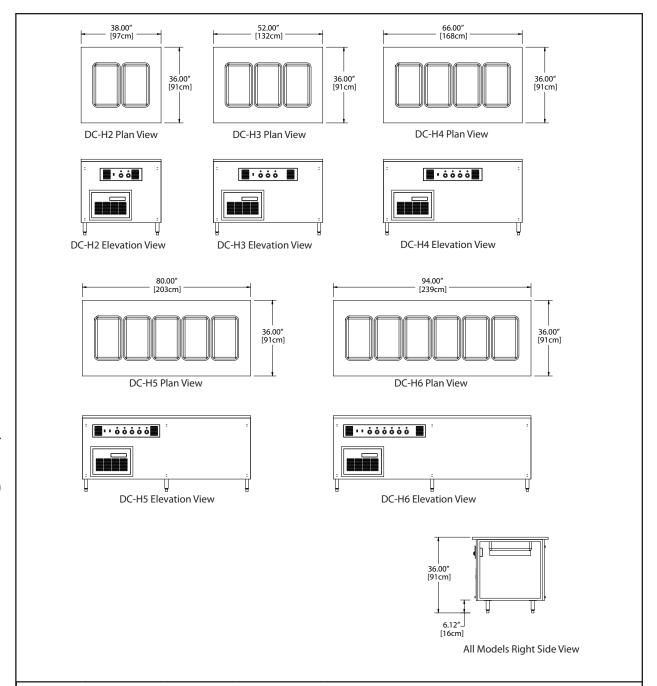
980 S. Isabella Rd. Mt. Pleasant, Michigan 48858

Phone: 800-733-8948 or 989-773-7981 Fax: 800-669-0619

www.delfield.com

Manitowoc





Specifications								
Model	Watts	# of 12"x20" Pans Held	V/Hz/Ph	Amps	Optional ESP Amps (500 watt per well, 208-230V)	Ship Weight		
DC-H2	2000	2	115/60/1	16.6	4.8/5.4	228lbs/103kg		
DC-H3	3000/4000	3	208-230/60/1	15.0/16.0	7.2/8.1	312lbs/142kg		
DC-H4	4000/4800	4	208-230/60/1	20.0/22.0	9.6/10.8	396lbs/180kg		
DC-H5	5000/6000	5	208-230/60/1	24.0/27.0	12.0/13.5	480lbs/218kg		
DC-H6	6000/7200	6	208-230/60/1	29.0/32.0	14.4/16.2	564lbs/256kg		

Delfield reserves the right to make changes to the design or specifications without prior notice.

980 S. Isabella Rd. Mt. Pleasant, Michigan 48858 Phone: 800-733-8948 or 989-773-7981 Fax: 800-669-0619 www.delfield.com Printed in the U.S.A. DSDCH 06/13



From:

02/02/2017

Project: To:

Graceland/Holabird

ITEM# 22 - MILK COOLER (2 EA REQ'D)

Piper Products MILK-8

Reflections Milk Cooler, 60"L x 36"H, modular mobile design, (400) 1/2 pint carton capacity, stainless steel top, fiberglass unit, fully insulated, UL, NSF

ACCESSORIES

Mfr	Qty Model	Spec
Piper Products	2	1 year warranty parts and labor from date of purchase
Piper Products	2	120v/60/1ph, 10.5 amps, NEMA 5-15P
Piper Products	2	Color to be selected



"Cool Pool" Milk Cooler

Air Cooled Refrigeration

"LIDS OFF OPERATION" DURING

PEAK SERVING TIMES FOR UP



The Piper Milk Cooling unit offers you the latest design innovation in milk cooling - our patented refrigerated holding "Cool Pool" system. Designed for "lids-off" use on tray make-up lines and in cafe/buffet operations, this unique system establishes a pool of cold air in which the product is held at 40 degrees Fahrenheit serving temperature.

One unique feature of this unit is the milk does NOT have to be transferred back to the main cooler at the end of the day! It can be stored in this unit without fear of temperature degradation.

STANDARD FEATURES

- Seamless, molded FRP body with smooth exterior and rounded corners
- 16-gauge stainless steel top with fully welded square turndowns on all sides
- Enclosed base
- Removable lids with key locks
- Removable louvered panels on front and rear of compressor end
- Condensing unit on slide-out rails for ease of service
- Stainless steel liner with drain and hose connections
- Fully insulated
- Heated condensate pan
- Anti-condensate top heater
- Automatic on-demand defrost
- 4" diameter swivel plate casters with brakes
- Interlocking mechanism is provided to interlock with other Reflections units

JOB	ITEM #	QTY#

MODEL NUMBER

- ☐ MILK-8
- ☐ MILK-12

DIMENSIONS

- MILK-8 36"H x 34"D x 60"L
- ◆ MILK-12 36"H x 34"D x 77"L
- 36" height on all standard units

REFRIGERATION SYSTEM

- 1/2 horsepower, 60 cycle, 120VAC, single phase compressor, thermostatically controlled
- Dial thermometer
- ◆ Environmentally safe 134A refrigerant

ELECTRICAL

- All units available in 120 volt
- Seven foot electrical cord and plug
- ◆ On/Off switch with indicator light with
- ◆ thermostat controls located behind louvered access panel

STANDARD COLORS

- ☐ Wine Red (RAL 3005)
- ☐ Signal Red (RAL 3001)
- ☐ Yellow (RAL 1021)
- ☐ Light Blue (RAL 5012)
- ☐ Gentiane Blue (RAL 5010)
- ☐ Water Blue (RAL 5021)
- ☐ Moss Green (RAL 6005)
- ☐ Squirrel Gray (RAL 7000)
- □ Black
- □ White
- ◆ Custom colors available
- ◆ Optional Graphics Packages available

COMMON OPTIONS

- Tray slides
- Bullet feet
- See reverse side for additional options

WARRANTY

One year parts and labor. Warranty is detailed on inside front cover of the price list.

SPFC B-9



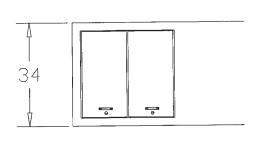
300 S. 84th Avenue Wausau, WI 54401 Phone: 800-544-3057 Fax: 715-842-3125

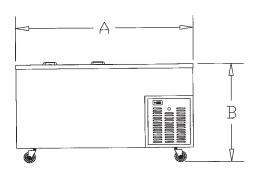
Graceland/Holabird



"Cool Pool" Milk Cooler

Air Cooled Refrigeration





Model#	(A) Length	(B) Width	Height	Capacity crates	Capacity 1/2 pt cartons	*Amperage 120V	*NEMA Cap No.	Ship Wt. (lbs)
MILK-8	60"	34"	36"	8	400	10.5	5-15P	370
MILK-12	77"	34"	36"	12	600	10.5	5-15P	410

Petite models are not available

DIMENSION ADDITIONS FOR OPTIONS

- ◆ Add 12-3/4" to width for solid ribbed tray slide
- ◆ Add 12-1/2" to width for 3-bar tray slide

OPTIONS / ACCESSORIES

	Part #	Description	
RSRTS		Solid 3-ribbed tray slide, 16-gauge stainless steel	
	RSFTS	Solid flat tray slide, 16-gauge stainless steel	
R3BTS		3-bar tray slide	
RBL		Stainless steel 6" adjustable bullet feet	
	RMRCE	Extended Compressor Warranty	
	SLD	Self-leveling dispensing unit	

B-9 SPEC



300 S. 84th Avenue Wausau, WI 54401 Phone: 800-544-3057 Fax: 715-842-3125 LIMITED WARRANTY: PIPER PRODUCTS warrants to the original purchaser parts and labor for a period of twelve (12) months from the date of purchase. See manufacturer's complete warranty for details.

It is our policy to build equipment which is design certified by companies that have been accredited at the Federal Level by the Occupational Safety and Health Agency (OSHA) and ANSI as a National Recognized Testing Laboratory. These companies include CSA International, Underwriters Laboratories, and the National Sanitation Foundation. However, a continuing program of product improvement makes it necessary to submit new models to the agencies as they are developed. Consequently, all models may not bear the appropriate labels at all times.

We reserve the right to change specifications and product design without notice. Such revisions do not entitle buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment. Information is not for design purposes.

Graceland

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 23 - COLD PAN SERVING COUNTER (2 EA REQ'D)

Delfield DC-MC4

Concepts™ Mechanically Cooled Serving Counter, 66" length, (4) 12" x 20" pan capacity, stainless steel top, front & rear removable panels, thermostat for temperature control, integral V-stamp pan rest, open base, 1" drain, 6" legs, 404A refrigerant, cUL, UL, NSF, 1/4 hp (contact factory for price)

ACCESSORIES

Mfr	Qty	Model	Spec
Delfield	2		NOTE: Freight quotes are only valid from Delfield
Delfield	2		115v/60/1-ph, 7.0 amps, NEMA 5-15P,standard
Delfield	2		(1) Year parts & labor, warranty standard
BSI	2	XG3950	XGuard Mega Span Food Shield, single self service, fully adjustable, 14" wide tempered glass top shelf & 10" wide sneeze guard, 1-1/2" diameter stainless steel tubing double supports, NSF, UL Listed (Contact factory for price)
BSI	2		Finish: Brushed aluminum Stainless steel
BSI	2		1" radius corner, standard



Concepts[™] Serving Systems

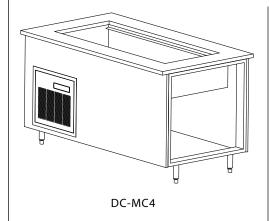
Self-Contained Mechanically Cooled Serving Counter

Project
ltem
Quantity
CSI Section 11400
Approved
Date

Models

DC-MC2 Self-contained mechanically cooled serving counter, fits two standard 12"x20" pans DC-MC3 Self-contained mechanically cooled serving counter, fits three standard 12"x20" pans DC-MC4 Self-contained mechanically cooled serving counter, fits four standard 12"x20" pans DC-MC5 Self-contained mechanically cooled serving counter, fits five standard 12"x20" pans

Self-contained mechanically cooled serving counter, fits six standard 12"x20" pans DC-MC6



Standard Features

- NSF-7 certified performance
- Heavy duty stainless steel top
- Reinforced stainless steel front and rear removable panels
- Heavy duty base support structure
- Standard on 6" legs
- Integral V-stamp pan rest
- Must be fixed hard wired
- High density foamed environmentally friendly, Kyoto Protocol Compliant, Non ODP (Ozone Depletion Potential), Non GWP (Global Warming Potential) polyurethane keeps energy costs
- Environmentally friendly R-404A refrigerant
- Thermostat for temperature control
- 36" work height
- One year parts and labor standard warranty

Options & Accessories

- Custom lengths available per inch
- Granite, Hanstone and Solid Surface top materials
- Laminated base panels
- Finished stainless steel or laminated end panels
- Décor panels Graphics packages
- FlexiShield® foodshields
- Signage with overstructures, lights and heatlamps
- Refrigerated base inserts
- Heated base inserts
- Dry storage base inserts
- Mechanical access doors
- Casters (stand alone units only) Kickplates (units with legs only)
- Adapter plates and bars
- Remote refrigeration refrigerant)
- Tray slides
- 34" work height
- 220V/50 cycle³
- Inclusion of this option will alter electrical specifications of the unit

Specifications

Exterior body is constructed of 0.75" Melamine reinforced front and rear panels with 22 gauge stainless steel skin and 1" polyethylene horizontal rib supports. Horizontal brace on rear is constructed of 18 gauge galvanized steel. The exterior ends are unfinished.

Exterior top is constructed of 14 gauge stainless steel. Horizontal top supports on front and rear are constructed with 18 gauge galvanized steel. Top end supports are 12 gauge stainless steel.

Interior base bottom is constructed of 16 gauge galvanized steel. Vertical base support braces are 14 gauge galvanized

The refrigerated cold pan is 9" (23cm) deep and constructed of stainless steel. The cold pan is separated from the exterior top by a thermal break. Copper refrigeration tubing is attached to the sides and bottom of the cold pan and is fully insulated with foamed in place environmentally friendly. Kyoto Protocol Compliant, Non ODP (Ozone Depletion Potential), Non GWP (Global Warming Potential) polyurethane insulation, Cold pan

is equipped with a 1" (2.5cm) I.P.S. drain plumbed to the drain valve located behind the hinged louvered door. Temperatures of 33°F (1°C) to 41°F (5°C) are maintained with page recessed 3" (7.6cm) at 86°F ambient room temperature. Pans by others.

Refrigeration system uses R-404A refrigerant and has a selfcontained 115 volt, 60 Hertz, single phase hermetically sealed condensing unit with adjustable cold pan pressure control.

Leas: Bases mounted on 6.12" adjustable leas.









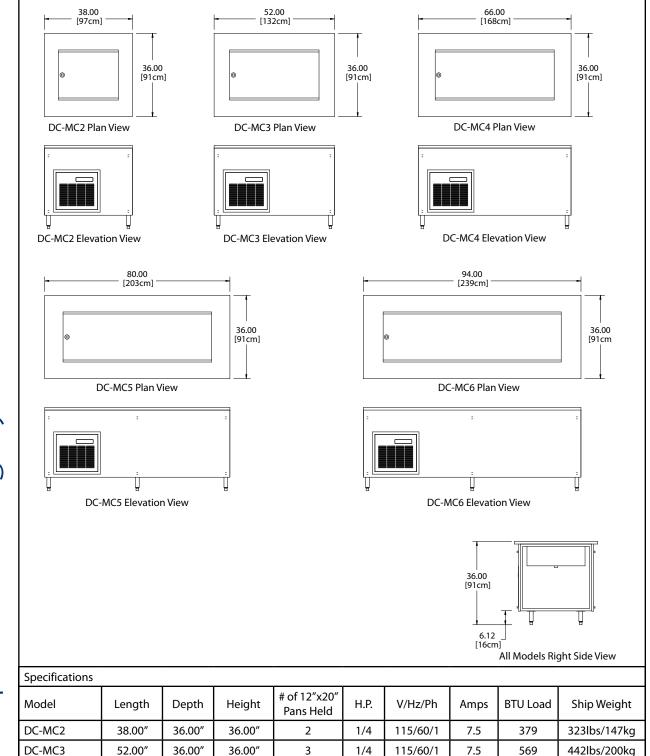
980 S. Isabella Rd. Mt. Pleasant, Michigan 48858

Phone: 800-733-8948 or 989-773-7981 Fax: 800-669-0619

www.delfield.com

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Delfield reserves the right to make changes to the design or specifications without prior notice.

36.00"

36.00"

36.00"

980 S. Isabella Rd. Mt. Pleasant, Michigan 48858

66.00"

80.00"

94.00"

Phone: 800-733-8948 or 989-773-7981 Fax: 800-669-0619 www.delfield.com

36.00"

36.00"

36.00"

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115/60/1

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758

948

1138

1/4

1/4

1/3



DC-MC4

DC-MC5

DC-MC6

561lbs/254kg

680lbs/308kg

799lbs/362kg

BSI XG3950 Item #23



XGUARD™ FOOD SHIELDS

BSI

A STATE OF	GENERAL	INFORM	ATION

Project Name: Item:

Quantity: XG3950 Model:

Length:

STANDARD NSF LISTED FINISH OPTIONS

☐ Brushed Aluminum/SS ☐ Stainless Steel

☐ Gloss Black □ Wrinkle Black

☐ Polished Brass Finish

□ Other

LIGHT OPTIONS

☐ LED Light Unit

□ Linear T-5 Fluorescent Unit

For warmers contact BSI factory.

GLASS DETAILS

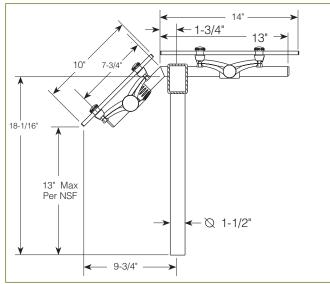
Maximum centerline length equals 14'

GLASS OPTIONS

- □ 1" Radius Corner (standard)
- Square Corners
- 1/4" Tempered Glass (not for shelves) Centerline Max 54"
- 3/8" Tempered Glass (for shelf or span more than 54") Centerline Max 66"
- □ 1/2" Tempered Glass (for shelf or span more than 66") Centerline Max 72"

XG3950 Mega Span





To meet NSF guidelines, end panels are included on all BSI quotations unless specifically excluded. (See End Panel Page for More Details.)

INSTALLATION OPTIONS

Above-Counter	 Surface Installation 720A/726A: Steel Post and Flange w/Flange Cover Surface Installation 725A: Cut Flange
Under-Counter	□ Under-Counter Installation 720A/726A: Steel Post and Flange w/Flange Cover or w/out Flange Cover
(Requires Under-Counter Reinforcement & Access)	Under-Counter Installation 725A: Narrow Custom Flange
See Installation Page for More Details.	

* Approval Drawings Required

Printed in the U.S.A. (August 2015) BSI, LLC Specifications subject to change without notice.

Patent Number US 8,403,430 B2

Rv. 7



XGuards can be provided with a UL Listed light or warmer.



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^{*} Maximum span between legs on counter is recommended at 168".

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 24 - UTILITY COUNTER W/ FROST TOP AND DOUBLE SIDED DISPLAY AND CASHIER COUNTER WITH TWIN TRAY SLIDE (1 EA REQ'D)

Delfield SCFT-50-NU

Shelleysteel™ Frost Top Serving Counter, 50" long, stainless steel frost top elevated 1-5/8" above counter top, perimeter trough with drain, stainless steel enclosed base, 5" swivel casters, self-contained refrigeration with R404A, cUL, UL, NSF, 1/4 hp (contact factory for price)

ACCESSORIES

Mfr	Qty	Model	Spec
Delfield	1		NOTE: Freight quotes are only valid from Delfield
Delfield	1		36" standard height
Delfield	1		115v/60/1-ph, 7.0 amps, NEMA 5-15P, standard
Delfield	1		(1) year parts & (90) day labor warranty, standard
BSI	1	XG3950-2	XGuard Mega Span Food Shield, double self service, fully adjustable, tempered glass top shelf & 10" wide sneeze guards, 1-1/2" diameter stainless steel tubing double supports, NSF, UL Listed (Contact factory for price)
BSI	1		Finish: Brushed aluminum Stainless steel
BSI	1		1" radius corner, standard

SCFT-NU

Mobile Self-Contained Frost Top Serving Counter

Project	:
	ty
	tion 11400
	/ed
Date _	

Models

- SCFT-36-NU 36" Mobile frost top serving counter without understorage
- SCFT-50-NU 50" Mobile frost top serving counter without understorage
- SCFT-60-NU 60" Mobile frost top serving counter without understorage
- SCFT-74-NU 74" Mobile frost top serving counter without understorage
- SCFT-96-NU 96" Mobile frost top serving counter without understorage



SCFT-74-NU

Standard Features

- Stainless steel exterior body and top
- Galvanized bottom
- Frost top is one piece stainless steel construction; perimeter drain with valve located at bottom of unit standard
- 18" x 26" sheet pan can rest on frost top
- · On/off switch located on exterior of unit
- SCFT units are standard with enclosed base
- Environmentally friendly R404A refrigerant
- A maximum 10' long cord and plug
- All exterior panels reinforced with overlapping corners, welded in place
- All body cutouts reinforced with channel supports
- All units are standard on 5" diameter polyurethane swivel casters for easy cleaning
- Easy to use stainless steel interlock system is standard on base and tray slides
- Environmentally friendly HFC-404A refrigerant
- One year parts and 90 day labor standard warranty

Options & Accessories

- Tray slides and work shelves
- 10" (25cm) wide composite fold-down cutting boards
- Line-up interlock device
- Food shields
- Glass-front counter protector
- 12" (30cm) wide stainless steel overshelf
- Fluorescent or incandescent light fixtures*
- Open understorage with shelf
- 120V/60Hz/1ø, 10 amp convenience outlet with breaker*
- Dry storage compartment
- Stainless steel trim strips
- 14" x 30" (36cm x 76cm) stainless steel end drop shelf
- 6" (15cm) high adjustable stainless steel legs in lieu of casters
- Laminate exterior panels in lieu of stainless steel exterior panels
- * Inclusion of these options will alter the electrical specifications of unit

Specifications

Exterior body is constructed of stainless steel side panels and galvanized bottom. All exterior side panels are reinforced with overlapping corners and are welded in place. All body cutouts are reinforced with galvanized channel supports.

Exterior top is constructed of stainless steel, welded, ground and polished into one integral unit. Top is fabricated with square exterior corners.

Frost top is stainless steel, one-piece construction and perimeter trough. Underside of frost top is sealed with refrigeration lines and insulated with high-density, closed cell environmentally friendly, Kyoto Protocol Compliant, Non ODP (Ozone Depletion Potential), Non GWP (Global Warming Potential) polyurethane. Frost top assembly is enclosed in a galvanized steel jacket. The frost top is separated from the exterior top be a thermal break.

Refrigeration system uses HCFC-404a refrigerant and has a self-contained 115 volt, 60 Hertz, single phase hermetically sealed condensing unit. Unit is wired with a 3-wire, grounded, maximum 10' (3m) cord and plug. Unit has an on/off switch mounted on the exterior.

Casters: Unit is mounted on 5" (13cm) diameter swivel casters with non-marking polyolefin tires and plate brakes. Overall height of caster assembly is 6.00" (15cm).





IFT-NU: Mobile Self-Contained Frost Top Serving Counte





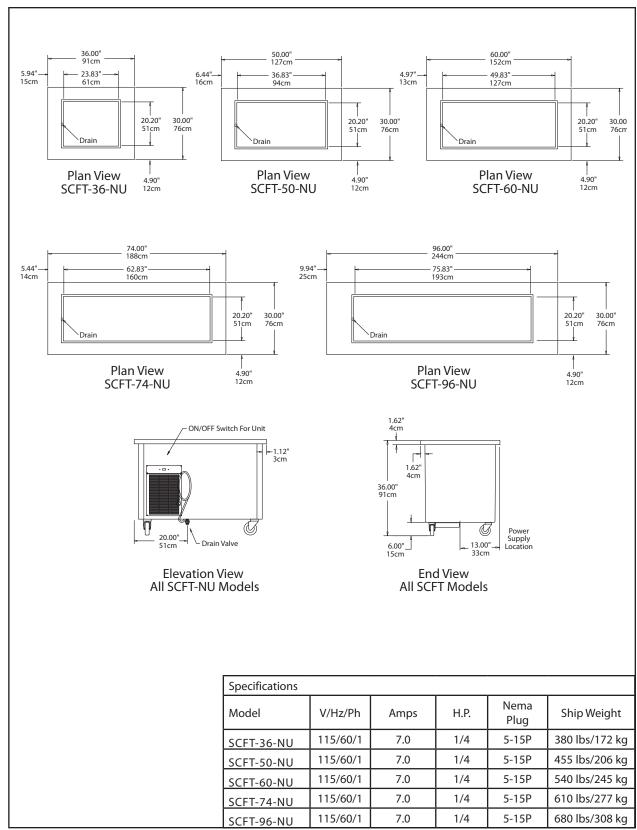
980 S. Isabella Rd. Mt. Pleasant, Michigan 48858

Phone: 800-733-8948 or 989-773-7981 Fax: 800-669-0619

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Delfield reserves the right to make changes to the design or specifications without prior notice.

980 S. Isabella Rd. Mt. Pleasant, Michigan 48858 Phone: 800-733-8948 or 989-773-7981 Fax: 800-669-0619 www.delfield.com Printed in the U.S.A. DSSCFTNU 07/12



BSI XG3950-2 Item #24



XGUARD™ FOOD SHIELDS



GENERAL INFORMATION

Project Name: Item:

Quantity: XG3950-2 Model:

Length:

STANDARD NSF LISTED FINISH OPTIONS

- ☐ Brushed Aluminum/SS ☐ Stainless Steel
- ☐ Gloss Black □ Wrinkle Black
- ☐ Polished Brass Finish
- □ Other

LIGHT OPTIONS

- ☐ LED Light Unit
- □ Linear T-5 Fluorescent Unit

For warmers contact BSI factory.



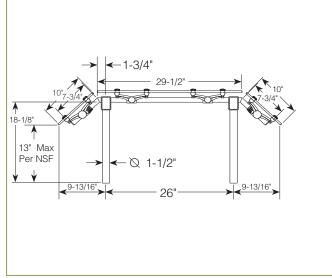
Maximum centerline length equals 14'

GLASS OPTIONS

- □ 1" Radius Corner (standard)
- Square Corners
- 1/4" Tempered Glass (not for shelves) Centerline Max 54"
- 3/8" Tempered Glass (for shelf or span more than 54") Centerline Max 66"
- □ 1/2" Tempered Glass (for shelf or span more than 66") Centerline Max 72"

XG3950-2 **Double-Sided Mega Span**





To meet NSF guidelines, end panels are included on all BSI quotations unless specifically excluded. (See End Panel Page for More Details.)

INSTALLATION OPTIONS

Under-Counter

Above-Counter

- ☐ Surface Installation 720A/726A: Steel Post and Flange w/Flange Cover
- Surface Installation 725A: Cut Flange
- □ Under-Counter Installation 720A/726A: Steel Post and Flange w/Flange Cover or w/out Flange Cover
- □ Under-Counter Installation 725A: Narrow Custom Flange

See Installation Page for More Details.

(Requires Under-Counter Reinforcement & Access)

* Approval Drawings Required

Printed in the U.S.A. (August 2015) BSI, LLC Specifications subject to change without notice. XGuards can be provided with a UL Listed light or warmer.





Page: 76



Patent Number US 8,403,430 B2

Rv. 7

^{*} Maximum span between legs on counter is recommended at 168".

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 25 - STOOL (2 EA REQ'D)

Nexel HB18

Steel Stool, adjustable height 18"-27", 18 gauge x 7/8" tubular steel electrically seam-welded construction, 14" steel/hardboard round seat, no backrest, steel foot ring, telescoping legs adjustable on 1" increments, gray baked enamel finish (must purchase in multiples of two)



SEATING/STOOLS

В C E C. STEEL HARDBOARD SQUARE SEAT WITH BACKREST

HEIGHT **ADJUSTABLE STEEL STOOLS**

Heavy duty 18 gauge x 7/8" tubular steel electrically seamwelded construction assures strength and rigidity. Convenient steel foot ring. Telescoping legs adjust on 1" increments. Choice of 14" steel/hardboard or gray vinyl upholstered seat. Adjustable 12"W x 53/4"H curved steel or vinyl upholstered backrest. Durable gray baked enamel finish. Sold 2 per package of a model.

UPHOLSTERED SEAT AND BACKREST

Adj. Height

18-27

24-33

E. UPHOLSTERED SEAT Adj. Height" Model No. Model No. 18-27 **UPSI8 UPSBI8** UPSB24 UPS24

A. STEEL HARDBOARD ROUND SEAT WITH BACKREST **B. STEEL HARDBOARD SEAT**

Adj. Height

18-27

24-33

COMFORT

STOOLS

lodel No.	Adj. Height"	Model No.
HBRBI8	18-27	HBI8
IBRB24	24-33	HB24

Extra Thick 5" Seat!

HEIGHT

ADJUSTS 19" TO 251/2"

Adj. Height"	Model No.
18-27	HBSBI8
24-33	HBSB24

ERGONOMIC

WORK STAND LOCK-IN TILT ONE TOUCH CONTROL **ADJUSTM** ENT Lets You Sit While Standing!

PLYWOOD SEAT **SWIVEL STOOL**

Built for Comfort

and Durability! 360° **Swivel**

Stool is ideal for warehouse, factory or machine shop use. Height is manually adjustable from 19" to 251/2". Large 14¹/2" diameter 5" thick vinyl seat and adjustable back. 23" diameter chrome foot ring. Four 2" nylon twin wheel casters for mobility.

	Black	Gray	Blue
Description	Model No.	Model No.	Model No.
Stool	CS14BK	CS14GY	CS14BL
Stool with Back	CS14BBK	CS14BGY	CS14BBL

Ergonomically designed work stand is great when working for long periods of time on machinery or assembly line. Waterfall contour seat allows proper leg circulation. Quality vinyl is bonded to 2" thickly padded seat for durability and comfort. Tilt control knob allows 14" W x 10"D seat to rock with you, or can be locked for stability. 21" to 31" pneumatic height adjustment for easy operator positioning. Five prong 24" molded base has rubber pads for stability.

Model No. ERGO10

Large, contoured plywood seat rotates 360° and adjusts easily from 20" to 28". Adjustable 14"W x 6"H back and 15¹/₂"W x 14"D contoured waterfall seat with foot ring relieves pressure and reduces lower back fatigue. Heavy gauge, tubular, steel frame. Foot ring raises legs and relieves pressure. Gray baked enamel finish. Optional casters add mobility.

> Model No. PLY15 Casters (Set of 4) Model CASR



02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 26 - MOBILE TRASH CAN AND DOLLY (2 EA REQ'D)

Rubbermaid FG353600GRAY

Square BRUTE® Container, without lid, 40 gallon, 23-1/2"D x 28-3/4"H, nesting handles, rounded corners & smooth contours, plastic construction, gray

ACCESSORIES

Mfr	Qty	Model	Spec
Rubbermaid	2	FG353000BLA	Square BRUTE® Dolly, 17-1/4"D x 6-1/4"H, for 3526
			and 3536 containers, 250 lb. capacity, black

BRUTE® Square Containers and Mega BRUTE® UTILITY REFUSE

BRUTE® Square Containers

Increased capacity for storage or refuse collection.

- Square shape offers up to 14% more capacity than round containers
- Tight-fitting indented lid design helps protect dry goods and other contents, while facilitating stacking during transportation and storage
- Nesting handles allow secure fit in side-by-side use
- Gray and white are USDA Meat and Poultry Equipment Group listed and assist in complying with HACCP guidelines
- Product SKU FG351700 Combo meets DOT #178.603, #178.606, and #178.608 criteria for shipping of solid regulated medical waste
- Certified to NSF Std. #2 (Red, Gray, and White) and Std. #21 (Gray
- Customizable with BIOHAZARD symbol or your logo







CONTAINERS AND LIDS

No.	Color	Description	U.S. Dimensions	U.S. Capacity	U.S. Ship Wt/Ctn	Metric Dimensions	Metric Capacity	Metric Ship Wt/Ctn	Can Liners	Pack
FG351700	RED	Combo Pack includes FG352600 Square BRUTE® Container, FG352900 Snap-Lock® Lid	21.5" sq x 22.63" h	28 gal	74.6 lb	54.6 cm sq x 57.5 cm	106 L	33.8 kg	5016-88^	6
FG352600	WHT, RED, GRAY	BRUTE® Square Container without Lid	21.5" sq x 22.5" h	28 gal	59.8 lb	54.6 cm sq x 57.2 cm	106 L	27.1 kg	5016-88 ^A	6
FG353600	WHT, GRAY	BRUTE® Square Container without Lid	23.5" sq x 28.75" h	40 gal	57.1 lb	59.7 cm sq x 73 cm	151.4 L	25.9 kg	5079, 5013-884	4
FG353673	BLUE	BRUTE® Square Recycling Container without Lid	23.5" sq x 28.75" h	40 gal	58.4 lb	59.7 cm sq x 73 cm	151.4 L	26.5 kg	5079, 5013-88^	4
FG352700	WHT, RED, GRAY	Lid for FG352600 Container	22" sq x 2" h		16.8 lb	55.9 cm sq x 5.1 cm		7.6 kg		6
FG352900	RED	Snap-Lock® Lid for FG352600 Container	22" sq x 2.13" h		16.8 lb	55.9 cm sq x 5.4 cm		7.6 kg		6
FG353900	WHT, GRAY	Lid for FG353600 Container	24" sq x 2" h		15.3 lb	61 cm sq x 5.1 cm		6.9 kg		4

^aNot for sale in California. NSF Standard 2 Certification applies to containers and lids.

Mega BRUTE® Mobile Collectors

The Mega BRUTE® Mobile Collector is a highly maneuverable and versatile waste and linen collection and sortation system. Innovative design delivers improved productivity and ease-of-use.

- High capacity—120-gallon/400-pound capacity
- Waste and linen sortation options support recycling efforts
- Highly maneuverable; fits through a standard 36" doorway and travels easily on and off most elevators
- Rear doors ease handling of heavy filled liners



Optional lid (FG9W7200) fully covers contents; center hinge allows access to either end of Mega BRUTE® Mobile Collector.



Can Liner Retainer secures a 55-gallon can liner and flips up for easy access to storage area.

2007 EDITORS' CHOICE **AWARD WINNER**

Top Product Pick Tools/Equipment Category BUILDINGS Magazine

SORTATION OPTIONS

Holds an optional 23-gallon Slim Jim® container for improved waste sortation and recycling.

EASILY MANEUVERABLE

Large 12" wheels and 5" nonmarking lockable casters in a diamond pattern allow Mega BRUTE® Mobile Collector. to turn on its own axis



Ideal for storing extra can liners and other cleaning supplies.

	No.	Color	Description	U.S. Dimensions	U.S. Capacity	U.S. Ship Wt/Ctn	Metric Dimensions	Metric Capacity	Metric Ship Wt/Ctn	Pack
New! 🕲	FG9W7100	BLA	Mega BRUTE® Mobile Collector – 3-Pack	52.5" l x 27.5" w x 42.5" h	120 gal	222.0 lb	133.4 cm x 69.9 cm x 108 cm	454.3 L	100.7 kg	3
New! 🚳	FG9W7300	BLA	Mega BRUTE® Mobile Collector – 1-Pack	52.5" l x 27.5" w x 42.5" h	120 gal	74.0 lb	133.4 cm x 69.9 cm x 108 cm	454.3 L	33.6 kg	1
New!	FG9W7200	BLA	Mega BRUTE® Mobile Collector Lid	49.5" l x 30" w x 10.5" h	N/A	12.4 lb	125.7 cm x 76.2 cm x 26.7 cm	N/A	5.6 ka	1



02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 27 - MOBILE RECYCLE BIN (2 EA REQ'D)

Rubbermaid FG353600GRAY

Square BRUTE® Container, without lid, 40 gallon, 23-1/2"D x 28-3/4"H, nesting handles, rounded corners & smooth contours, plastic construction, gray

ACCESSORIES

Mfr	Qty	Model	Spec
Rubbermaid	2	FG353000BLA	Square BRUTE® Dolly, 17-1/4"D x 6-1/4"H, for 3526 and 3536 containers, 250 lb. capacity, black

BRUTE® Square Containers and Mega BRUTE® UTILITY REFUSE

BRUTE® Square Containers

Increased capacity for storage or refuse collection.

- Square shape offers up to 14% more capacity than round containers
- Tight-fitting indented lid design helps protect dry goods and other contents, while facilitating stacking during transportation and storage
- Nesting handles allow secure fit in side-by-side use
- Gray and white are USDA Meat and Poultry Equipment Group listed and assist in complying with HACCP guidelines
- Product SKU FG351700 Combo meets DOT #178.603, #178.606, and #178.608 criteria for shipping of solid regulated medical waste
- Certified to NSF Std. #2 (Red, Gray, and White) and Std. #21 (Gray
- Customizable with BIOHAZARD symbol or your logo







CONTAINERS AND LIDS

No.	Color	Description	U.S. Dimensions	U.S. Capacity	U.S. Ship Wt/Ctn	Metric Dimensions	Metric Capacity	Metric Ship Wt/Ctn	Can Liners	Pack
FG351700	RED	Combo Pack includes FG352600 Square BRUTE® Container, FG352900 Snap-Lock® Lid	21.5" sq x 22.63" h	28 gal	74.6 lb	54.6 cm sq x 57.5 cm	106 L	33.8 kg	5016-88^	6
FG352600	WHT, RED, GRAY	BRUTE® Square Container without Lid	21.5" sq x 22.5" h	28 gal	59.8 lb	54.6 cm sq x 57.2 cm	106 L	27.1 kg	5016-88 ^A	6
FG353600	WHT, GRAY	BRUTE® Square Container without Lid	23.5" sq x 28.75" h	40 gal	57.1 lb	59.7 cm sq x 73 cm	151.4 L	25.9 kg	5079, 5013-884	4
FG353673	BLUE	BRUTE® Square Recycling Container without Lid	23.5" sq x 28.75" h	40 gal	58.4 lb	59.7 cm sq x 73 cm	151.4 L	26.5 kg	5079, 5013-88^	4
FG352700	WHT, RED, GRAY	Lid for FG352600 Container	22" sq x 2" h		16.8 lb	55.9 cm sq x 5.1 cm		7.6 kg		6
FG352900	RED	Snap-Lock® Lid for FG352600 Container	22" sq x 2.13" h		16.8 lb	55.9 cm sq x 5.4 cm		7.6 kg		6
FG353900	WHT, GRAY	Lid for FG353600 Container	24" sq x 2" h		15.3 lb	61 cm sq x 5.1 cm		6.9 kg		4

^aNot for sale in California. NSF Standard 2 Certification applies to containers and lids.

Mega BRUTE® Mobile Collectors

The Mega BRUTE® Mobile Collector is a highly maneuverable and versatile waste and linen collection and sortation system. Innovative design delivers improved productivity and ease-of-use.

- High capacity—120-gallon/400-pound capacity
- Waste and linen sortation options support recycling efforts
- Highly maneuverable; fits through a standard 36" doorway and travels easily on and off most elevators
- Rear doors ease handling of heavy filled liners



Optional lid (FG9W7200) fully covers contents; center hinge allows access to either end of Mega BRUTE® Mobile Collector.



Can Liner Retainer secures a 55-gallon can liner and flips up for easy access to storage area.

2007 EDITORS' CHOICE **AWARD WINNER**

Top Product Pick Tools/Equipment Category BUILDINGS Magazine

SORTATION OPTIONS

Holds an optional 23-gallon Slim Jim® container for improved waste sortation and recycling.

EASILY MANEUVERABLE

Large 12" wheels and 5" nonmarking lockable casters in a diamond pattern allow Mega BRUTE® Mobile Collector. to turn on its own axis



Ideal for storing extra can liners and other cleaning supplies.

	No.	Color	Description	U.S. Dimensions	U.S. Capacity	U.S. Ship Wt/Ctn	Metric Dimensions	Metric Capacity	Metric Ship Wt/Ctn	Pack
New! 🕲	FG9W7100	BLA	Mega BRUTE® Mobile Collector – 3-Pack	52.5" l x 27.5" w x 42.5" h	120 gal	222.0 lb	133.4 cm x 69.9 cm x 108 cm	454.3 L	100.7 kg	3
New! 🚳	FG9W7300	BLA	Mega BRUTE® Mobile Collector – 1-Pack	52.5" l x 27.5" w x 42.5" h	120 gal	74.0 lb	133.4 cm x 69.9 cm x 108 cm	454.3 L	33.6 kg	1
New!	FG9W7200	BLA	Mega BRUTE® Mobile Collector Lid	49.5" l x 30" w x 10.5" h	N/A	12.4 lb	125.7 cm x 76.2 cm x 26.7 cm	N/A	5.6 ka	1



02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 28 - MOBILE TRAY & FLATWARE DIPSENSER (2 EA REQ'D)

Vollrath 99305

Signature Server® with Stainless Steel Countertops, Tray & Flatware Cart, stainless steel finish, entire unit construction of type 304 stainless, polished to #4 finish or equal, cutouts in top shelf for 12 flatware containers (containers included with unit), protective rubber bumpers on all corners of tray shelf, entire unit riveted construction, 4" heavy-duty ball-bearing swivel casters, rubber tread wheels, hold up to 160 trays & 475 pieces of flatware, 22-1/2"Lx38"Wx34"H, optional laminate finishes can be applied over all-stainless unit, NSF, Made in USA ACCESSORIES

Mfr	Qty	Model	Spec
Vollrath	2		All stainless, standard



Project:

Item Number:

Quantity:

SIGNATURE SERVER® TRAY AND FLATWARE CART WITH STAINLESS STEEL COUNTER



Signature Server® Tray and Flatware Cart with Stainless Steel Counter

FEATURES

- Vollrath's Signature Server® Tray and Flatware Cart with Stainless Steel Counter features a 300 series stainless steel top and tray shelf
- Custom colors also available
- Twelve perforated flatware cylinders are standard
- Holds up to 160 trays and 475 pieces of flatware
- Corner base bumpers are standard
- Heavy-duty 4" (10 cm) swivel casters with brakes

Note: Signature Server® equipment orders cannot be cancelled or returned.

WARRANTY: All models shown come with Vollrath's standard warranty against defects in materials and workmanship. For full warranty details, please refer to www.Vollrath.com.

DESCRIPTION

Signature Server® is the choice when functionality and modular ease of use are your top priorities. Signature Server® Serving Equipment is an industry standard, with updated features to better serve the operator.

ITEM AND OPTIONS

Item	Options	Options						
	Color (Color (Black is standard						
Item No	Matte Laminate	Wood Grain	Stainless Steel					
ILCIII INO	Laiiiiiate	uraiii	Oleci					
99305	36686	36692	-					

Agency Certifications



Due to continued product improvement, please consult www.vollrath.com for current product specifications.

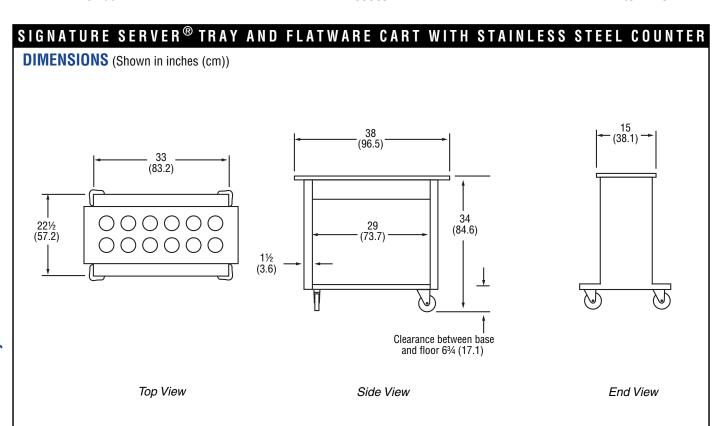
Approvals	Date



Graceland/Holabird

The Vollrath Company, L.L.C. 1236 North 18th Street Sheboygan, WI 53081-3201 U.S.A. Customer Service: 800.628.0830 Canada Customer Service: 800.695.8560 Main Fax: 800.752.5620 or 920.459.6573

Technical Services: 800.628.0832 Technical Services Fax: 920.459.5462





The Vollrath Company, L.L.C. 1236 North 18th Street Sheboygan, WI 53081-3201 U.S.A. Customor Service: 800 628 0830

Customer Service: 800.628.0830 Canada Customer Service: 800.695.8560 Main Fax: 800.752.5620 or 920.459.6573 Technical Services: 800.628.0832 Technical Services Fax: 920.459.5462

www.vollrath.com

From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 29 - SPARE NO.

<Spare No.>

From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 30 - SPARE NO.

<Spare No.>

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 31 - MOBILE CASHIER STATION W/ TWIN TRAY SLIDE (1 EA REQ'D)

Fabricator CUSTOM

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 32 - FLOOR POWER AND DATA OUTLET (2 EA REQ'D)

Fabricator CUSTOM
See Electrical Drawings

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 33 - CASH REGISTER AND CARD SCANNER (2 EA REQ'D)

Fabricator CUSTOM

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 34 - WALK-IN COOLER/FREEZER (1 EA REQ'D)

MasterBilt CUSTOM

See Master-Bilt Shop Drawing MB1641628DC-B

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 35 - EVAPORATOR, 34'F (1 EA REQ'D)

MasterBilt E1HZ013A/641628
See Master-Bilt Shop Drawing I

See Master-Bilt Shop Drawing MB1641628DC-B

<Included>

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 36 - CONDENSER, 34'F (1 EA REQ'D)

MasterBilt SHHZ015WC/641628
See Master-Bilt Shop Drawing MB

See Master-Bilt Shop Drawing MB1641628DC-B

<Included>

02/02/2017

Project: To: From:

Graceland/Holabird

<Included>

ITEM# 37 - EVAPORATOR, -10"F (1 EA REQ'D)

MasterBilt E1LZ0075B/641628 See Master-Bilt Shop Drawing MB1641628DC-B

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 38 - CONDENSER, -10'F (1 EA REQ'D)

MasterBilt SHLZ020WC/641628

See Master-Bilt Shop Drawing MB1641628DC-B

<Included>

From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 39 - SPARE NO.

<Spare No.>

From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 40 - SPARE NO.

<Spare No.>

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 41 - MOBILE WALK-IN SHELVING (7 EA REQ'D)

Metro Q456EG3

MetroMax Q[™] Mobile Shelving Unit, 48"W x 21"D x 67-5/16"H, (4) open grid polymer shelves with Microban® antimicrobial protection, (4) posts, (4) swivel polyurethane casters (2 braked), epoxy coat steel frame, KD, NSF

Item #			

Job

METROMAX Q™ SHELVING

with *Microban Antimicrobial Product Protection

Part of the innovative MetroMax $iQ^{\mathbb{M}}$ Storage System, MetroMax $Q^{\mathbb{M}}$ is a longer life storage solution than conventional wire shelving. The product offers durable polymer mats that remove for easy cleaning and protect stored items from damage. Quick adjust shelves and MetroMax iQ accessories provides a very efficient use of storage space. MetroMax $Q^{\mathbb{M}}$ is integrated with online space planning tools and tutorials. **www.metro.com/iQ**

- Longer-life performance: Durable, corrosion proof polymer mats protect the shelves from normal wear and tear. Robust epoxy coated steel frames and posts hold as much weight as Metro's wire shelving. Weight capacity for evenly distributed loads:
 - 800 lbs. (363kg) per shelf for lengths of 24" to 48" (610 to 1220mm) 600 lbs. (275kg) per shelf for lengths of 54" (1370mm) or longer 2,000 lbs. (907kg) maximum per stationary unit.
- Interchangeable: MetroMax Q and MetroMax i™ shelves, posts, and most accessories are compatible on the same unit. Use MetroMax Q shelves with MetroMax i™ polymer posts for increased corrosion protection. Use MetroMax i™ solid shelves when spill containment is required or as a bottom shelf to protect supplies from dirt or backsplashes from mops.
- Easier to clean and maintain: Polymer mats can be easily removed and cleaned in a sink or dish machine. Microban antimicrobial product protection is built into the high contact areas of the shelf including the mats, frames, and posts to protect the product from bacteria, mold, mildew, and fungus that cause odors and product degradation. Microban protection keeps the product "cleaner between cleanings".
- Quick to Adjust: Patented corner release allows shelves to be unlocked without tools. Simply flip each corner release, relocate the wedge connectors on the posts, and reposition the shelf. Quickly adjust shelves to reclaim wasted vertical space.
- **Smooth, Protective Surfaces:** Smooth shelf mats protect packaged items from unwanted rips, tears, or damage.
- Open Grid and Solid Mat Options: MetroMax Q is available with open grid mats as standard. Open grid shelves promote air circulation and light penetration.
- MetroMax i[™] solid shelves can be used with MetroMax Q grid shelves on the same unit and are available in 18" and 24" (457 and 610mm) depths. For 21" (530mm) deep MetroMax Q, solid mat overlays are available.
- Efficient, Organized Storage: Premium MetroMax iQ[™] accessories efficiently organize, contain, and compartmentalize all space between shelves.
- Quick to Assemble: MetroMax Q assembles easily in minutes, without tools. Shelves can be adjusted at 1" (25mm) increments along the post. Shelf wedges have a window to locate your desired position.



MetroMax Q Mobile Unit







MetroMax Q with Accessories and MetoMax i Solid Bottom Shelf

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InterMetro Industries Corporation North Washington Street Wilkes-Barre, PA 18705 www.metro.com



MetroMax Q[™] Polymer and Steel Shelvin

Metro Q456EG3 Item #41



METROMAX Q[™] POLYMER AND STEEL SHELVING

Specifications

- **Shelf frames and posts:** Steel with electroplated substrate and highly durable, abrasion-resistant epoxy finish. Epoxy finish has built-in Microban antimicrobial product protection. The adjustable foot is reinforced nylon.
- Shelf Mats: Injection molded polypropylene with exclusive built-in Microban® antimicrobial product protection.
- Shelf Wedge Connector: Reinforced nylon.
- **Temperature range:** -20°F (-29°C) to 125°F (52°C) continuous use, with intermittent exposure to 200°F (93°C) for cleaning.

Standard Interchangeable Shelves

- Part number includes shelf with removable mats and one bag of wedges.
- MetroMax Q grid shelves, MetroMax i™ grid and solid shelves are all compatible on the same unit.

Nominal Width (in.) (mm)	Nominal Length (in.) (mm)	MetroMax Q Shelf with Grid Mat Model No.	Approx Pkd. Wi (lbs.) (MetroMax i [™] Shelf with Solid Mat Model No.	Approx. Pkd. Wt. (lbs.) (kg)	
18 457	24 610	MQ1824G	6.2 2	2.8	MX1824F	12.7	5.8
18 457	30 760	MQ1830G	8.0	3.6	MX1830F	14.5	6.6
18 457	36 914	MQ1836G	9.7	4.4	MX1836F	17.2	7.8
18 457	42 1060	MQ1842G	11.4	5.2	MX1842F	20.1	9.1
18 457	48 1220	MQ1848G	13.2	6.0	MX1848F	23.1	10.5
18 457	54 1372	MQ1854G	15.0	8.6	MX1854F	21.5	9.7
18 457	60 1524	MQ1860G	16.7	7.6	MX1860F	23.2	10.5
18 457	72 1829	MQ1872G	20.0	9.1	MX1872F	27.5	12.5
21 530	24 610	MQ2124G	8.0	3.6	_		
21 530	30 760	MQ2130G	9.7	4.4	_		
21 530	36 914	MQ2136G	11.4	5.2	_		
21 530	42 1060	MQ2142G	12.8	5.8			
21 530	48 1220	MQ2148G	14.5	6.6	_		
21 530	54 1372	MQ2154G	16.7	7.6	_		
21 530	60 1524	MQ2160G	18.5	8.4	_		
21 530	72 1829	MQ2172G	21.7	9.9	_		
24 610	24 610	MQ2424G	9.7	4.4	MX2424F	14.2	6.4
24 610	30 760	MQ2430G	11.4	5.2	MX2430F	15.9	7.2
24 610	36 914	MQ2436G	13.1	6.0	MX2436F	19.6	8.9
24 610	42 1060	MQ2442G	14.1	6.4	MX2442F	21.5	9.8
24 610	48 1220	MQ2448G	15.8	7.1	MX2448F	25.3	11.5
24 610	54 1372	MQ2454G	18.5	8.4	MX2454F	25.0	11.3
24 610	60 1524	MQ2460G	20.3	9.2	MX2460F	26.8	12.1
24 610	72 1829	MQ2472G	23.5 10	0.7	MX2472F	31.0	14.1



MetroMax Q Open Grid Shelf



MetroMax i™ Solid Shelf

Actual Dimensions: Width: Add 3/s" (10mm) to nominal size. Length: Subtract 3/16" (5mm) from nominal size.

Heavy-Duty Dunnage Shelves

- Corrosion proof MetroMax i[™] dunnage shelf is compatible with MetroMax Q.
- Open grid and solid version available.
- Weight capacity per shelf evenly distributed:
 1,200 lbs. (544kg) on shelves up to and including 48"
 (1220mm) long; 900 lbs. (408kg) for shelves
 60" (1524mm) long.
- Dunnage shelves are recommended for use on units with four posts.

Nominal Width		Le	minal ength	Shelf with Grid Mat	Approx. Pkd. Wt.	Shelf with Solid Mat Model No.	Approx. Pkd. Wt.	
(in.)	(in.) (mm) (in.) (mm)		Model No.	Model No. (lbs.) (kg)		(lbs.) (kg)		
18	457	36	914	MHP1836G	18 8.2	MHP1836F	22 10.0	
18	457	48	1220	MHP1848G	22 10.0	MHP1848F	26 11.8	
18	457	60	1524	MHP1860G	26 11.8	MHP1860F	30 13.6	
24	610	36	914	MHP2436G	21 9.5	MHP2436F	25 11.3	
24	610	48	1220	MHP2448G	27 12.2	MHP2448F	31 14.1	
24	610	60	1524	MHP2460G	33 15.0	MHP2460F	37 16.8	

Solid Mat Overlays

- Overlays snap onto the open grid mats to create a solid surface.
- Available for 21" (530mm) deep MetroMax Q shelves.

Fit	ts Shelf			orox. I. Wt.
(in.)	(mm)	Model No.	(lbs.)	(kg)
21x24	530x610	Q2124SM	0.35	0.16
21x30	530x760	Q2130SM	0.45	0.20
21x36	530x914	Q2136SM	0.50	0.23
21x42	530x1060	Q2142SM	0.60	0.27
21x48	530x1220	Q2148SM	0.70	0.32
21x54	530x1372	Q2154SM	0.80	0.36
21x60	530x1524	Q2160SM	0.90	0.41
21x72	530x1829	Q2172SM	1.00	0.45

Metro Q456EG3 Item #41

METROMAX Q[™] POLYMER AND STEEL SHELVING

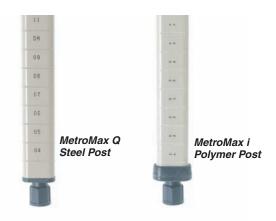


Standard Interchangeable Posts

- MetroMax Q: Epoxy coated steel with Microban antimicrobial product protection.
- MetroMax i: Polymer with Microban antimicrobial product protection.
- Stationary posts include an adjustable leveling foot to compensate for uneven floors. Leveling foot can be adjusted 1" (25mm).
- When mounting a shelving unit to a dolly base, stationary posts are used.
- Special height cut posts are available. Consult your Metro representative.

Nominal Height (in.) (mm)	Actual Height* (in.) (mm)	MetroMax Q Steel Model No.	STATIONARY POST WITA Approx. Pkd. Wt. (lbs.) (kg)	TH LEVELING FOOT MetroMax i Polymer Model No.	Appi Pkd. (lbs.)	
13 370	14 ³ / ₄ 375	MQ13PE	1.0 0.5	MX13P	0.5	0.2
27 685	28 ³ / ₄ 730	MQ27PE	2.0 0.9	MX27P	0.9	0.4
33 875	343/4 883	MQ33PE	2.5 1.1	MX33P	1.0	0.5
54 1370	543/4 1391	MQ54PE	4.0 1.8	MX54P	1.6	0.7
63 1585	623/4 1594	MQ63PE	4.5 2.0	MX63P	1.8	0.8
74 1690	743/4 1899	MQ74PE	5.5 2.5	MX74P	2.2	1.0
86 2195	86³/₄ 2203	MQ86PE	6.5 2.9	MX86P	2.5	1.1

			POST FOR ST	EM CASTER	
Nominal Height	Actual Height*	MetroMax Q Steel	Approx. Pkd. Wt.	MetroMax i Polymer	Approx. Pkd. Wt.
(in.) (mm)	(in.) (mm)	Model No.	(lbs.) (kg)	Model No.	(lbs.) (kg)
13 370	133/4 349	MQ13UPE	1.0 0.5	MX13UP	0.5 0.2
27 685	273/4 705	MQ27UPE	2.0 0.9	MX27UP	0.9 0.4
33 875	33 ³ / ₄ 857	MQ33UPE	2.5 1.1	MX33UP	1.0 0.5
54 1370	533/4 1365	MQ54UPE	4.0 1.8	MX54UP	1.6 0.7
63 1585	613/4 1568	MQ63UPE	4.5 2.0	MX63UP	1.8 0.8
70 1778	69 ³ / ₄ 1765	MQ70UPE	5.0 2.3		
74 1690	733/4 1873	MQ74UPE	5.5 2.5	MX74UP	2.3 1.0
86 2195	853/4 2178	MQ86UPE	6.5 2.9	MX86UP	2.5 1.4



Replacement Leveling Foot: Model No. RPM3-FOOT Replacement Post Cap for Steel Post:

Model No. RPMQS-POSTCAP

Replacement Post Cap for Polymer Post:

Model No. RPMXS-POSTCAP

Replacement MetroMax Q Wedges

Model No. MQ9985 Bag of 4



NOTE: Compatibility with existing Metro polymer mat shelving systems

- MQ9985 wedges are compatible with original MetroMax Q shelves and posts.
- The post centers on MetroMax Q have been changed to allow interchangeability with MetroMax i™ shelves. MetroMax Q shelves manufactured within or after April 2009 are not compatible with Q shelves made prior to April 2009.
- MetroMax Q is not compatible with original MetroMax manufactured prior to April 2009.
- Posts listed in above table (ex. MQ74PE, MX74PE) can be used with original MetroMax Q shelves made prior to April 2009.

Post Clamp

Adds stability by joining posts of two separate units together. With it, each unit is supported by four posts and buttressed by the adjacent unit.

Model No. 9994X





Foot Plate

Use to add stability to the shelving unit or to bolt units to the floor.

Model No. Zinc 9993Z

Model No. Stainless Steel 9993S





Stem Casters

A variety of stem casters are offered for MetroMax i[™] mobile applications. Stem caster models include bumpers. See Catalog Sheet 11.20 for stem casters.

Load Rating: 3 x Stem Caster Load Rating, maximum — 900 lbs. (363kg) per stem caster cart.







METROMAX Q™ POLYMER AND STEEL SHELVING



Item #41

Starter and Add-On Units

- 4- and 5-tier models available. Consult the Metro catalog for models.
- Starter units: consist of shelves and (4) posts
- Add-on units: consist of shelves, (2) posts, and "S" Hooks (M9995)

"S" Hook: Used to "add on" one or multiple MetroMax Q™ storage systems while eliminating the cost of two posts per unit. Can be used to join units end-to-end, back-toback, at right angles, etc. Two "S" hooks are required for each shelf.

Cat. No. M9995



MetroMax Q[™] Intermediate

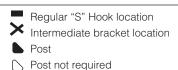
Q456EG3

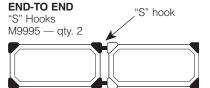
"S" Hook: Use when configuring MetroMax Q Starter and Add-On Units at right angles.

Model No. Q9995Z

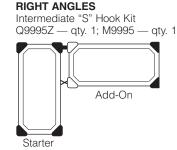






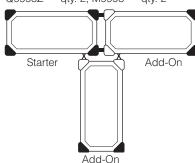


Add-On



COMBINATION

Intermediate "S" Hook Kits Q9995Z — qty. 2; M9995 — qty. 2



MetroMax Q[™] Carts

- 4- and 5-tier models
- Grid shelf models

Starter

- Units consist of shelves, (4) posts, (2) swivel, and (2) swivel brake casters.
- Consult the Metro catalog for models.

All Metro Catalog Sheets are available on our Web Site: www.metro.com



InterMetro Industries Corporation

North Washington Street, Wilkes-Barre, PA 18705 Phone: 570-825-2741 Fax: 570-825-2852

For Product Information: Latin America: 1.561.333.3824 U.S. and Canada: 1.800.433.2232 Europe: +31.76.587.7550

Printed in U.S.A. 4/09 Information and specifications are subject to change without notice. Please confirm at time of order

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Middle East/Africa: +971.4.811.8286

Graceland/Holabird

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 42 - MOBILE PAN RACK (2 EA REQ'D)

Advance Tabco NR-20

Rack, mobile pan, full height, nesting design, open sides, with angle tray guides on 3" centers, capacity 20 - 18" x 26" sheet pans or 40 - half-size pans, all-welded aluminum construction, front loading, 69-1/2" high



ALUMINUM

NESTING PAN RACK



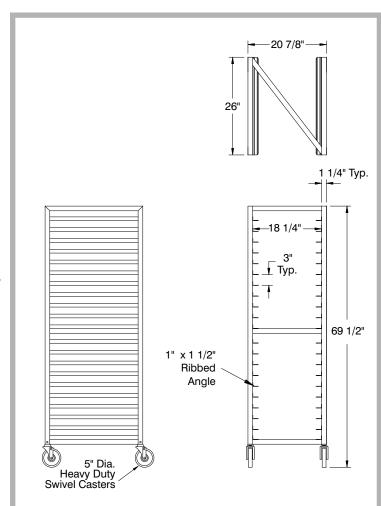




DIMENSIONS and SPECIFICATIONS

TOL ± .500"

ALL DIMENSIONS ARE TYPICAL



FEATURES:

Nesting design to facilitate maximum storage in minimum space. Heavy Duty welded construction.

20 Pan capacity.

1" x 1-1/2" ribbed angles.

Heavy Duty 5" Stem Swivel Casters.

500 lb. Maximum Load.

CONSTRUCTION:

Fully welded 1-1/4" square tubing frame and diagonal cross supports.

Angles are 1" x 1/1/2" fully welded at 3" spacing

MATERIAL:

Extruded aluminum angles, upright tubing, and support pieces.

MODEL #	Pan Capacity	Shelf Spacing	Overall Size L x W x H	Weight
NR-20	20	3"	21" x 26" x 69 1/2"	45 lbs.

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Fax: (775) 972-1578

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 43 - MOBILE SHELVING UNIT (4 EA REQ'D)

Metro 2448NS

Super Erecta® Shelf, wire, 48"W x 24"D, stainless steel finish, plastic split sleeves are included in each carton, NSF ACCESSORIES

Mfr	Qty	Model	Spec
Metro	4	27UPS	Super Erecta® Post, 28-1/2"H, for use with stem casters, stainless finish
Metro	4	4LD	Super Erecta® Stem Caster, swivel, 4"D wheel, 1/2" face, resilient rubber wheel tread, 125 lb. capacity



Item #	

Jo	b					

SUPER ERECTA SHELF® WIRE SHELVING

- Unique Design: The open wire design of these shelves minimizes dust accumulation and allows free circulation of air, greater visibility of stored items and greater light penetration.
- Durable Construction: Super Erecta shelves and posts are constructed of heavy-gauge carbon steel or Type 304 stainless steel.
- Choice of Finishes: Super Erecta Brite[™] and chromeplated for dry storage; Metroseal 3[™] with Microban[®] antimicrobial product protection and stainless steel for corrosive environments; and attractive epoxy color options for merchandising applications.
- **Versatile:** Super Erecta Shelf® wire shelving can adapt to your changing needs. By using various accessories, hundreds of shelving configurations become possible.
- Fast, Secure Assembly: SiteSelect™ Posts have a double groove visual guide feature every 8" (203mm), circular grooves at 1" (25mm) increments, and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
- Adjustability: Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
- **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
- Shelf Accessibility: Shelves can be loaded/unloaded easily from all sides This open construction allows maximum use of storage cube.
- Adjustable Feet: Bolt levelers compensate for surface irregularities.

Note: Stainless stationary posts are equipped with stainless steel leveling feet.





 ${}^{\star}\text{MICROBAN}{}^{\circ}\text{ and the MICROBAN}{}^{\circ}\text{ symbol are registered trademarks of the Microban Products Company, Huntersville, NC.}$



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Wire Shelving

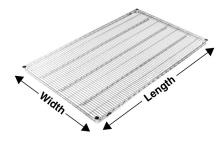
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2448NS Metro Item #43



SUPER ERECTA SHELF® **WIRE SHELVING**

Wire Shelves





Split Sleeve



Aluminum Split Sleeve

- Metroseal 3: Metro's proprietary epoxy coating contains Microban® antimicrobial product protection. Microban antimicrobial protects the epoxy coating from bacteria, mold, mildew, and fungus that cause odors, stains, and product degradation.
- See spec sheet 10.14 for epoxy color options.
- Plastic split sleeves are included with each shelf Replacements are available: Cat. No. 9985 (bag of 4)
- Aluminum split sleeves are recommended for abusive mobile applications and autoclave applications.

Cat. No. 9986Z (bag of 4 with zinc C-rings)

Cat. No. 9986S (bag of 4 with stainless steel C-rings)

Load capacity (evenly distributed) per shelf

Depths: 14" to 24" (355 to 610mm)

800 lbs. (363kg) for lengths of 18" to 48" (457 to 1219mm) 600 lbs. (272kg) for lengths of 54" (1370mm) or longer

• Load capacity (evenly distributed) per unit. Stationary shelving units have a maximum load capacity (evenly distributed) of 2,000 lbs. (907kg)

Mobile units have a maximum capacity of three times the caster load rating up to but not exceeding 1,000 lbs. (453kg) total. Consult the Metro catalog for caster load ratings

• SUPER ERECTA SHELF meets Government Specifications MIL-S-40144E.

Model No.	Model No.	Model No.	Model No.	Nominal Width/Length	App Pkd.	Wt.
Super Erecta Brite	Chrome	Metroseal 3 with Microban®	Stainless	(in.) (mm)	(lbs.)	(kg)
1424BR	1424NC	1424NK3	1424NS	14x24 355x610	6	2.7
1430 BR	1430NC	1430NK3	1430NS	14x30 355x760	7	3.2
1436BR	1436NC	1436NK3	1436NS	14x36 355x914	8	3.6
1442BR	1442NC	1442NK3	1442NS	14x42 355x1066	91/2	4.3
1448BR	1448NC	1448NK3	1448NS	14x48 355x1219	10 ¹ / ₂	4.7
1460BR	1460NC	1460NK3	1460NS	14x60 355x1524	14	6.3
1472BR	1472NC	1472NK3	1472NS	14x72 355x1829	17	7.7
1824BR	1824NC	1824NK3	1824NS	18x24 457x610	7	3.2
1830BR	1830NC	1830NK3	1830NS	18x30 457x760	8	3.6
1836BR	1836NC	1836NK3	1836NS	18x36 457x914	91/2	4.3
1842BR	1842NC	1842NK3	1842NS	18x42 457x1066	11	5.0
1848BR	1848NC	1848NK3	1848NS	18x48 457x1219	12	5.4
1854BR	1854NC	1854NK3	1854NS	18x54 457x1370	141/2	6.6
1860BR	1860NC	1860NK3	1860NS	18x60 457x1524	17	7.7
1872BR	1872NC	1872NK3	1872NS	18x72 457x1829	20	9.1
2124BR	2124NC	2124NK3	2124NS	21x24 530x610	8	3.6
2130BR	2130NC	2130NK3	2130NS	21x30 530x760	9	4.1
2136BR	2136NC	2136NK3	2136NS	21x36 530x914	11	5.0
2142BR	2142NC	2142NK3	2142NS	21x42 530x1066	12	5.4
2148BR	2148NC	2148NK3	2148NS	21x48 530x1219	14	6.4
2154BR	2154NC	2154NK3	2154NS	21x54 530x1370	16	7.3
2160BR	2160NC	2160NK3	2160NS	21x60 530x1524	18	8.2
2172BR	2172NC	2172NK3	2172NS	21x72 530x1829	24	10.9
2424BR	2424NC	2424NK3	2424NS	24x24 610x610	9	4.1
2430BR	2430NC	2430NK3	2430NS	24x30 610x760	11	5.0
2436BR	2436NC	2436NK3	2436NS	24x36 610x914	13	5.9
2442BR	2442NC	2442NK3	2442NS	24x42 610x1066	15	6.8
2448BR	2448NC	2448NK3	2448NS	24x48 610x1219	16	7.3
2454BR	2454NC	2454NK3	2454NS	24x54 610x1370	19	8.6
2460BR	2460NC	2460NK3	2460NS	24x60 610x1524	21	9.5
2472BR	2472NC	2472NK3	2472NS	24x72 610x1829	26	11.8

Note: 14" (355mm) deep units.

Free-standing units: Foot plates should be used and secured to the floor. Mobile units: maximum allowable post height is 54" (1370mm).

SUPER ERECTA SHELF® WIRE SHELVING



SiteSelect[™] Posts

Stationary Posts

Stationary posts are equipped with a leveling bolt to account for uneven floors.

- Height includes leveling bolt (completely tightened) and post cap Leveling bolt can be adjusted 1/2" (13mm).
- Foot plates may be ordered separately and installed in place of leveling foot.
- Replacement leveling bolts
 Zinc Cat. No. RPF04-004
 Stainless Steel Cat. No. RPF04-004C
- Replacement post cap for standard posts Black Cat. No. RPC06-035

Model No. Chrome	Model No. Metroseal 3 with Microban	Model No. Stainless Steel	Height (in.) (mm)	Appı Pkd. (lbs.)	
7P			7³/ ₈ 187	1/2	0.3
13P	13PK3	13PS	14³/ ₈ 365	1	0.5
27P		27PS	28 ³ / ₈ 720	13/4	0.75
33P	33PK3	33PS	34³/ ₈ 873	2	0.9
54P	54PK3	54PS	54 ⁷ / ₁₆ 1382	3	1.4
63P	63PK3	63PS	62 ⁷ / ₁₆ 1585	31/2	1.6
74P	74PK3	74PS	74¹/₂ 1892	4	1.8
86P	86PK3	86PS	861/2 2197	5	2.3
*96P			961/2 2450	5 ¹ / ₂	2.5

^{*96}P should not be used on units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.

SiteSelect Posts feature double grooves every 8" (203mm) to aid assembly.

Mobile Posts (For use with Stem Casters)

• Height includes post cap.

	Model No.			Approx.
Model No.	Metroseal 3	Model No.	Height	Pkd. Wt.
Chrome	with Microban	Stainless Steel	(in.) (mm)	(lbs.) (kg)
27UP		27UPS	273/4 704	13/4 0.75
33UP	33UPK3	33UPS	33 ³ / ₄ 857	2 0.9
54UP	54UPK3	54UPS	53 ¹³ / ₁₆ 1366	3 1.4
63UP	63UPK3	63UPS	61 ¹³ / ₁₆ 1570	31/2 1.6
	70UPK3		69 ³ / ₄ 1771	3 ³ / ₄ 1.7
74UP	74UPK3	74UPS	73 ⁷ / ₈ 1876	4 1.8
86UP	86UPK3	86UPS	85 ⁷ / ₈ 2181	41/2 2.0

Staked Posts (For use with Truck Dollies)

- Each post connects to the truck dolly through the stem receptacle. The stem receptacle is staked into the bottom of the post to ensure a durable connection in abusive mobile applications.
- Each includes a leveling/connecting bolt.

Model No.	Model No.	Height	Approx. Pkd. Wt.
Chrome	Stainless Steel	(in.) (mm)	(lbs.) (kg)
54P-STKD	54PS-STKD	54 ⁷ / ₁₆ 1382	3 1.4
63P-STKD	63PS-STKD	62 ⁷ / ₁₆ 1585	31/2 1.6
74P-STKD	74PS-STKD	74 ¹ / ₂ 1892	4 1.8

Swedged Posts (For use with Stem Casters in Cart Wash Applications)

• Each post has an aluminum cap swedged into the top of the post.

Model No.	Height	Approx. Pkd. Wt.
Stainless Steel	(in.) (mm)	(lbs.) (kg)
33UPS-SW	33 ³ / ₄ 857	2 0.9
54UPS-SW	53 ¹³ / ₁₆ 1366	3 1.4
63UPS-SW	61 ¹³ / ₁₆ 1570	31/2 1.6

Special Length Posts

Special length cut posts are available. Consult your Metro representative for more information.

SUPER ERECTA SHELF® WIRE SHELVING



Super Wide Shelving

• **High-density Storage:** Super Wide[™] shelves have a greater storage area for holding large quantities of supplies, especially large, bulky objects, providing maximum storage in minimum space.

2448NS

• Load Capacity (evenly distributed) per shelf: Depths: 30" and 36" (760 and 914mm)

600 lbs. (272kg) for lengths 48" (1219mm) or shorter.

400 lbs. (181kg) for lengths 54" (1370mm) or longer.

	Model No. Chrome			l No. Metroseal 3 Model No. No		Nominal (in.)	Width/Length (mm)	Approx. Pkd. Wt. (lbs.) (kg)		
٠	3036NC	3036NK3	3036NS	30x36	760x914	15	6.8			
	3048NC	3048NK3	3048NS	30x48	760x1219	21	9.5			
	3060NC	3060NK3	3060NS	30x60	760x1524	26 ¹ / ₂	11.8			
	3072NC	3072NK3	3072NS	30x72	760x1829	31	14.0			
	3636NC	3636NK3	3636NS	36x36	910x914	18	8.2			
	3648NC	3648NK3	3648NS	36x48	910x1219	23	10.4			
	3660NC	3660NK3	3660NS	36x60	910x1524	29	13.1			
	3672NC	3672NK3	3672NS	36x72	910x1829	341/2	15 4			



Foot Plates

- Use to bolt units to the floor, or when a broader, more stable foot is desired. Foot plates also help to protect floors by distributing the point load of the shelving unit across a larger contact point.
- Foot plates (completely tightened) add 1/8" (3mm) to the specified heights of each stationary post on the table.

Zinc Cat. No. 9993Z

Stainless Steel Cat. No. 9993S



"S" Hook

Used to add on shelving units with only two posts required. Order two per shelf level.
 Cat. No. 9995Z



All Metro Catalog Sheets are available on our Web Site: www.metro.com



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Asia/Pacific: +65.6567.8003 Middle East/Africa: +971.4.811.8286

For Product Information: Latin America: 1.561.333.3824 U.S. and Canada: 1.800.433.2232 Europe: +31.76.587.7550

Graceland/Holabird

Page: 109

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Job			

SUPER ERECTA SHELF® WIRE SHELVING

- Unique Design: The open wire design of these shelves minimizes dust accumulation and allows free circulation of air, greater visibility of stored items and greater light penetration.
- Durable Construction: Super Erecta shelves and posts are constructed of heavy-gauge carbon steel or Type 304 stainless steel.
- Choice of Finishes: Super Erecta Brite[™] and chromeplated for dry storage; Metroseal 3[™] with Microban[®] antimicrobial product protection and stainless steel for corrosive environments; and attractive epoxy color options for merchandising applications.
- **Versatile:** Super Erecta Shelf® wire shelving can adapt to your changing needs. By using various accessories, hundreds of shelving configurations become possible.
- Fast, Secure Assembly: SiteSelect™ Posts have a double groove visual guide feature every 8" (203mm), circular grooves at 1" (25mm) increments, and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
- Adjustability: Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
- **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
- Shelf Accessibility: Shelves can be loaded/unloaded easily from all sides This open construction allows maximum use of storage cube.
- Adjustable Feet: Bolt levelers compensate for surface irregularities.

Note: Stainless stationary posts are equipped with stainless steel leveling feet.





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InterMetro Industries Corporation North Washington Street Wilkes-Barre, PA 18705 www.metro.com



Wire Shelving

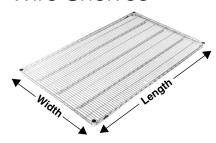
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27UPS Metro Item #43



SUPER ERECTA SHELF® **WIRE SHELVING**

Wire Shelves





Split Sleeve



Aluminum Split Sleeve

- Metroseal 3: Metro's proprietary epoxy coating contains Microban® antimicrobial product protection. Microban antimicrobial protects the epoxy coating from bacteria, mold, mildew, and fungus that cause odors, stains, and product degradation.
- See spec sheet 10.14 for epoxy color options.
- Plastic split sleeves are included with each shelf Replacements are available: Cat. No. 9985 (bag of 4)
- Aluminum split sleeves are recommended for abusive mobile applications and autoclave applications.

Cat. No. 9986Z (bag of 4 with zinc C-rings)

Cat. No. 9986S (bag of 4 with stainless steel C-rings)

Load capacity (evenly distributed) per shelf

Depths: 14" to 24" (355 to 610mm)

800 lbs. (363kg) for lengths of 18" to 48" (457 to 1219mm) 600 lbs. (272kg) for lengths of 54" (1370mm) or longer

• Load capacity (evenly distributed) per unit. Stationary shelving units have a maximum load capacity (evenly distributed) of 2,000 lbs. (907kg)

Mobile units have a maximum capacity of three times the caster load rating up to but not exceeding 1,000 lbs. (453kg) total. Consult the Metro catalog for caster load ratings

• SUPER ERECTA SHELF meets Government Specifications MIL-S-40144E.

Model No.	Model No.	Model No.	Model No.	Nominal Width/Length	App Pkd.	Wt.
Super Erecta Brite	Chrome	Metroseal 3 with Microban®	Stainless	(in.) (mm)	(lbs.)	(kg)
1424BR	1424NC	1424NK3	1424NS	14x24 355x610	6	2.7
1430 BR	1430NC	1430NK3	1430NS	14x30 355x760	7	3.2
1436BR	1436NC	1436NK3	1436NS	14x36 355x914	8	3.6
1442BR	1442NC	1442NK3	1442NS	14x42 355x1066	91/2	4.3
1448BR	1448NC	1448NK3	1448NS	14x48 355x1219	10 ¹ / ₂	4.7
1460BR	1460NC	1460NK3	1460NS	14x60 355x1524	14	6.3
1472BR	1472NC	1472NK3	1472NS	14x72 355x1829	17	7.7
1824BR	1824NC	1824NK3	1824NS	18x24 457x610	7	3.2
1830BR	1830NC	1830NK3	1830NS	18x30 457x760	8	3.6
1836BR	1836NC	1836NK3	1836NS	18x36 457x914	91/2	4.3
1842BR	1842NC	1842NK3	1842NS	18x42 457x1066	11	5.0
1848BR	1848NC	1848NK3	1848NS	18x48 457x1219	12	5.4
1854BR	1854NC	1854NK3	1854NS	18x54 457x1370	141/2	6.6
1860BR	1860NC	1860NK3	1860NS	18x60 457x1524	17	7.7
1872BR	1872NC	1872NK3	1872NS	18x72 457x1829	20	9.1
2124BR	2124NC	2124NK3	2124NS	21x24 530x610	8	3.6
2130BR	2130NC	2130NK3	2130NS	21x30 530x760	9	4.1
2136BR	2136NC	2136NK3	2136NS	21x36 530x914	11	5.0
2142BR	2142NC	2142NK3	2142NS	21x42 530x1066	12	5.4
2148BR	2148NC	2148NK3	2148NS	21x48 530x1219	14	6.4
2154BR	2154NC	2154NK3	2154NS	21x54 530x1370	16	7.3
2160BR	2160NC	2160NK3	2160NS	21x60 530x1524	18	8.2
2172BR	2172NC	2172NK3	2172NS	21x72 530x1829	24	10.9
2424BR	2424NC	2424NK3	2424NS	24x24 610x610	9	4.1
2430BR	2430NC	2430NK3	2430NS	24x30 610x760	11	5.0
2436BR	2436NC	2436NK3	2436NS	24x36 610x914	13	5.9
2442BR	2442NC	2442NK3	2442NS	24x42 610x1066	15	6.8
2448BR	2448NC	2448NK3	2448NS	24x48 610x1219	16	7.3
2454BR	2454NC	2454NK3	2454NS	24x54 610x1370	19	8.6
2460BR	2460NC	2460NK3	2460NS	24x60 610x1524	21	9.5
2472BR	2472NC	2472NK3	2472NS	24x72 610x1829	26	11.8

Note: 14" (355mm) deep units.

Free-standing units: Foot plates should be used and secured to the floor. Mobile units: maximum allowable post height is 54" (1370mm).

SUPER ERECTA SHELF® WIRE SHELVING



SiteSelect[™] Posts

Stationary Posts

Stationary posts are equipped with a leveling bolt to account for uneven floors.

- Height includes leveling bolt (completely tightened) and post cap Leveling bolt can be adjusted 1/2" (13mm).
- Foot plates may be ordered separately and installed in place of leveling foot.
- Replacement leveling bolts
 Zinc Cat. No. RPF04-004
 Stainless Steel Cat. No. RPF04-004C
- Replacement post cap for standard posts Black Cat. No. RPC06-035

Model No. Metroseal 3	Model No.	Height	Appı Pkd.	
with Microban	Stainless Steel	(in.) (mm)	(lbs.)	(kg)
		7 ³ / ₈ 187	1/2	0.3
13PK3	13PS	14³/ ₈ 365	1	0.5
	27PS	28 ³ / ₈ 720	1 ³ / ₄	0.75
33PK3	33PS	34 ³ / ₈ 873	2	0.9
54PK3	54PS	54 ⁷ / ₁₆ 1382	3	1.4
63PK3	63PS	62 ⁷ / ₁₆ 1585	31/2	1.6
74PK3	74PS	74 ¹ / ₂ 1892	4	1.8
86PK3	86PS	86¹/ ₂ 2197	5	2.3
		96¹/ ₂ 2450	5 ¹ / ₂	2.5
	Metroseal 3 with Microban 13PK3 33PK3 54PK3 63PK3 74PK3	Metroseal 3 with Microban Model No. Stainless Steel 13PK3 13PS 27PS 33PK3 34PK3 54PS 63PK3 63PS 74PK3 74PS	Metroseal 3 with Microban Model No. Stainless Steel Height (in.) Height (mm) 73/s 187 13PK3 13PS 143/s 365 27PS 283/s 720 33PK3 33PS 343/s 873 54PK3 54PS 547/1s 1382 63PK3 63PS 627/1s 1585 74PK3 74PS 741/2 1892 86PK3 86PS 861/2 2197	Metroseal 3 with Microban Model No. Stainless Steel Height (in.) Pkd. (lbs.) 7³/s 187 ¹/₂ 13PK3 13PS 14³/s 365 1 27PS 28³/s 720 1³/4 33PK3 33PS 34³/s 873 2 54PK3 54PS 54²/16 1382 3 63PK3 63PS 62²/16 1585 3¹/₂ 74PK3 74PS 74¹/₂ 1892 4 86PK3 86PS 86¹/₂ 2197 5

*96P should not be used on units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.

SiteSelect Posts feature double grooves every 8" (203mm) to aid assembly.

Mobile Posts (For use with Stem Casters)

• Height includes post cap.

	Model No.			Approx.
Model No.	Metroseal 3	Model No.	Height	Pkd. Wt.
Chrome	with Microban	Stainless Steel	(in.) (mm)	(lbs.) (kg)
27UP		27UPS	273/4 704	13/4 0.75
33UP	33UPK3	33UPS	33 ³ / ₄ 857	2 0.9
54UP	54UPK3	54UPS	53 ¹³ / ₁₆ 1366	3 1.4
63UP	63UPK3	63UPS	61 ¹³ / ₁₆ 1570	31/2 1.6
	70UPK3		69 ³ / ₄ 1771	3 ³ / ₄ 1.7
74UP	74UPK3	74UPS	73 ⁷ / ₈ 1876	4 1.8
86UP	86UPK3	86UPS	85 ⁷ / ₈ 2181	41/2 2.0

Staked Posts (For use with Truck Dollies)

- Each post connects to the truck dolly through the stem receptacle. The stem receptacle is staked into the bottom of the post to ensure a durable connection in abusive mobile applications.
- Each includes a leveling/connecting bolt.

Model No.	Model No.	Height	Approx. Pkd. Wt.
Chrome	Stainless Steel	(in.) (mm)	(lbs.) (kg)
54P-STKD	54PS-STKD	54 ⁷ / ₁₆ 1382	3 1.4
63P-STKD	63PS-STKD	62 ⁷ / ₁₆ 1585	3 ¹ / ₂ 1.6
74P-STKD	74PS-STKD	74 ¹ / ₂ 1892	4 1.8

Swedged Posts (For use with Stem Casters in Cart Wash Applications)

• Each post has an aluminum cap swedged into the top of the post.

Model No.	Height	Pkd. Wt.
Stainless Steel	(in.) (mm)	(lbs.) (kg)
33UPS-SW	33³/4 857	2 0.9
54UPS-SW	53 ¹³ / ₁₆ 1366	3 1.4
63UPS-SW	61 ¹³ / ₁₆ 1570	31/2 1.6

Special Length Posts

Special length cut posts are available. Consult your Metro representative for more information.

SUPER ERECTA SHELF® WIRE SHELVING



Super Wide Shelving

- **High-density Storage:** Super Wide[™] shelves have a greater storage area for holding large quantities of supplies, especially large, bulky objects, providing maximum storage in minimum space.
- Load Capacity (evenly distributed) per shelf: Depths: 30" and 36" (760 and 914mm)

 $600\ lbs.\ (272kg)$ for lengths $48"\ (1219mm)$ or shorter.

400 lbs. (181kg) for lengths 54" (1370mm) or longer.

Model No.	Model No. Model No. Metroseal 3		Nominal	Width/Length	App Pkd.		
Chrome	with Microban	Stainless Steel	(in.)	(mm)	(lbs.)	(kg)	
3036NC	3036NK3	3036NS	30x36	760x914	15	6.8	
3048NC	3048NK3	3048NS	30x48	760x1219	21	9.5	
3060NC	3060NK3	3060NS	30x60	760x1524	26 ¹ / ₂	11.8	
3072NC	3072NK3	3072NS	30x72	760x1829	31	14.0	
3636NC	3636NK3	3636NS	36x36	910x914	18	8.2	
3648NC	3648NK3	3648NS	36x48	910x1219	23	10.4	_
3660NC	3660NK3	3660NS	36x60	910x1524	29	13.1	
3672NC	3672NK3	3672NS	36x72	910x1829	341/2	15 4	_



Foot Plates

- Use to bolt units to the floor, or when a broader, more stable foot is desired. Foot plates also help to protect floors by distributing the point load of the shelving unit across a larger contact point.
- Foot plates (completely tightened) add 1/8" (3mm) to the specified heights of each stationary post on the table.

Zinc Cat. No. 9993Z

Stainless Steel Cat. No. 9993S



"S" Hook

Wire Shelving

Used to add on shelving units with only two posts required. Order two per shelf level.
 Cat. No. 9995Z



All Metro Catalog Sheets are available on our Web Site: www.metro.com



InterMetro Industries Corporation

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For Product Information: Latin America: 1.561.333.3824 Asia/Pacific: +65.6567.8003 U.S. and Canada: 1.800.433.2232 Europe: +31.76.587.7550 Middle East/Africa: +971.4.811.8286

Graceland/Holabird

Printed in U.S.A. Rev. 11/08



Metro

Item #	

Job _____

METRO® STEM CASTERS

- Metro Stem-Type Casters are designed to fit Super Erecta Shelf® posts to form shelf carts and other mobile units.
- Stainless Steel, Cart-Washable Casters offer grease seals and zerk fittings. Can withstand high-pressure washings.
- **Polymer Horn Casters:** Innovative polymer stem casters offer corrosion resistance and enhanced durability. For all medium-duty applications.
- Resilient Rubber Tread: A molded, soft tread that provides good floor protection along with quiet operation. Non-marking.
- **Polyurethane Tread:** Long-wearing; resists abrasion. Non-marking, shock absorbing.
- Wheel Brakes: Foot-operated. Available on all caster models.
- Caster Load Ratings: From 125 lbs. to 300 lbs. (57 to 136kg) See chart.
- **Donut Bumpers:** Furnished standard on all Metro stem casters.
- Additional Caster Types Available.

Note: SPECIAL WHEELS — V-groove, Conductive, Steel and Phenolic — are available on request. For additional information, contact InterMetro Industries Corporation or your InterMetro representative.

Resilient Rubber



5MB Wheel Brake Includes Donut Bumper (not shown)

5M Resilient Includes Donut Bumper (not shown)

Item #43

Stainless Steel, Cart Washable



Polymer Horn Casters





InterMetro Industries Corporation North Washington Street

North Washington Stree Wilkes-Barre, PA 18705 www.metro.com

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Casters (Stem Type)



METRO® STEM CASTERS



Item #43

Dimensions

Standard Casters — Stem Type

		heel meter	F	ace	Loa Rati				App Pkd	
Cat. No.	(in.)	(mm)	(in.)	(mm)	(lbs.)	(kg)	Туре	Wheel Tread	(lbs.)	(kg)
4LD	4	102	1/2	12	125	56	Stem/Swivel	Resilient	11/2	.6
5LD	5	127	1/2	12	125	56	Stem/Swivel	Resilient	2	.9
5M	5	127	11/4	32	200	90	Stem/Swivel	Resilient	$2^{1}/_{2}$	1.1
5MB	5	127	11/4	32	200	90	Stem/Brake	Resilient	23/4	1.2
5MR	5	127	11/4	32	200	90	Stem/Rigid	Resilient	31/2	1.5
5MDA	5	127	11/4	32	250	111	Stem/Swivel	High Modulus Donut	21/2	1.1
5MDBA	5	127	11/4	32	250	111	Stem/Brake	High Modulus Donut	25/8	1.17
5MDRA	5	127	11/4	32	250	111	Stem/Rigid	High Modulus Donut	23/8	1.08
5MP	5	127	11/4	32	300	135	Stem/Swivel	Polyurethane	21/8	.94
5MPB	5	127	1 1/4	32	300	135	Stem/Brake	Polyurethane	21/4	1
5MPR	5	127	1 1/4	32	300	135	Stem/Rigid	Polyurethane	2	.9

4LD

NOTE 1: Stem casters are shipped with donut bumper at no additional charge.

NOTE 2: Rigid casters are held in position by a connecting channel. When ordering rigid casters, shelf width must be known.

NOTE 3: Load Height for all 5M, 5MD and 5MP casters — $6^3/3x^8 \pm 1/1e^8$ (155 ± 1.5mm).

NOTE 4: Load Height for 4LD caster — $4^5/8x^8 \pm 1/1e^8$ (118 ± 1.5mm).

NOTE 5: Load Height for 5LD caster — $5^5/8x^8 \pm 1/1e^8$ (143 ± 1.5mm).

NOTE 6: Brakes are foot-operated.

Stainless Steel Cart-Washable Casters — Stem Type

	Wh Diam		F	ace	Loa Ratii				App Pkd.	orox. . Wt.
Cat. No.	(in.)	(mm)	(in.)	(mm)	(lbs.)	(kg)	Туре	Wheel Tread	(lbs.)	(kg)
5MDGSA	5	122	1 1/4	32	150	68	Swivel	High Modulus Donut	21/2	1.1
5MDBGSA	5	122	1 1/ ₄	32	150	68	Brake	High Modulus Donut	25/8	1.17
5MDRGSA	5	122	1 1/4	32	150	68	Rigid	High Modulus Donut	$2^{3}/_{8}$	1.08
5MPGSA	5	127	1 1/4	32	300	135	Swivel	Polyurethane	$2^{1}/_{8}$.94
5MPBGSA	5	127	1 1/4	32	300	135	Brake	Polyurethane	$2^{1}/_{4}$	1
5MPRGSA	5	127	1 1/4	32	300	135	Rigid	Polyurethane	2	.9

NOTE 1: Stem casters are shipped with donut bumper at no additional charge.

NOTE 2: Rigid casters are held in position by a connecting channel. When ordering rigid casters, shelf width **must be** known. NOTE 3: Load Height for all 5MD and 5MP casters — 63/s2* ± 1/16* (155 ± 1.5mm).

NOTE 4: All casters are grease sealed with zerk fittings in swivel and axle.

NOTE 5: Brakes are foot-operated.

NOTE 6: "D" in model number designates donut wheel made of high-modulus rubber.

Polymer Casters — Stem Type

	Wheel Diameter Face		Load Rating			Appro Pkd. V	
Cat. No.	(in.) (mm)	(in.) (mm)	(lbs.) (kg)	Туре	Wheel Tread	(lbs.)	(kg)
5PC	5 127	11/4 32	300 135	Swivel	Polyurethane	2	.9
5PCB	5 127	1 ¹ / ₄ 32	300 135	Brake	Polyurethane	2	.9
5PCR	5 127	11/4 32	300 135	Rigid	Polyurethane	2	.9

NOTE 1: Optional thread guards (blue) may be ordered by adding "-TG" to the desired model number (eg. 5PC-TG, 5PCB-TG, 5PCR-TG). **NOTE 2:** Stem casters are shipped with donut bumper **at no additional charge.**

NOTE 3: Rigid casters are held in place by a connecting channel. When ordering, shelf depth must be provided

Manufactured by:



InterMetro Industries Corporation

North Washington Street, Wilkes-Barre, PA 18705 Phone: 570-825-2741 • Fax: 570-825-2852

For Product Information Call: 1-800-433-2232 Visit Our Web Site: www.metro.com

Information and specifications are subject to change without notice. Please confirm at time of order.

Page: 115

102-041

Printed in U.S.A.

Graceland/Holabird

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 44 - DRY STORAGE DUNNAGE RACK (1 EA REQ'D)

John Boos JB04

Dunnage Rack, 1-tier, 24" W x 34" L x 12" H, stainless steel tubular construction & bullet feet, all welded set up



ITEM #:	QTY:
MODEL #:	
PROJECT NAME:	

3601 S. Banker St. Effingham, IL 62401 • P.O. BOX 609 • Ph: (888) 431-2667 • Fax: (800) 433-2667

"JB" STAINLESS STEEL DUNNAGE RACKS (NSF)



FEATURES:

- 16 GAUGE STAINLESS STEEL LEGS AND SHELF
- TYPE 300 STAINLESS STEEL WITH #4 POLISH, SATIN FINISH
- STANDS ARE STANDARD 12" HIGH
- ADJUSTABLE BULLET FEET
- OPTIONAL 5" HEAVY DUTY CASTERS
- SHIPPED WELDED SET-UP
- NSF CERTIFIED

CONSTRUCTION:

• TOP: STAINLESS STEEL FRAME IS TIG WELDED, EXPOSED WELDS ARE POLISHED TO MATCH ADJACENT SURFACE.

MATERIAL:

- SHELF: 1-1/2" SQUARE O.D. 16 GAUGE TYPE 300 STAINLESS STEEL WITH #4 POLISH, SATIN FINISH
- LEGS: 1 5/8" ROUND O.D. 16 GAUGE TYPE 300 TUBULAR STAINLESS STEEL
- FEET: 1" ADJUSTABLE STAINLESS STEEL BULLET FEET



16 GAUGE STAINLESS STEEL COOLER RACKS

20" WIDE	QTY	24" WIDE	QTY	30" WIDE	QTY
JB01		JB04		JB07	
JB02		JB05		JB08	
JB03		JB06		JB09	

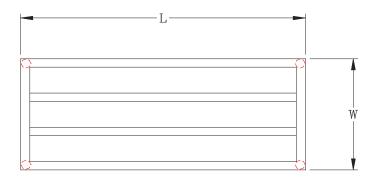
OPTIONAL ACCESSORIES

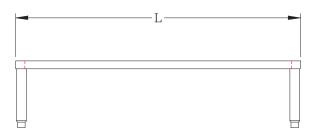
DESCRIPTION	MODEL#	QTY
CASTER		
STAINLESS STEEL FEET		

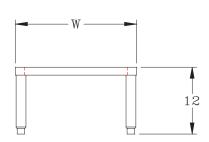
Graceland/Holabird Page: 117

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DETAILED SPECIFICATIONS







- SHIPPED WELDED SET-UP
- · ALL DIMENSIONS ARE TYPICAL.
- TOLERANCE +/- .500".



16 GAUGE STAINLESS STEEL COOLER RACKS

LENGTH	20" WIDE	WT. (LBS)	24" WIDE	WT. (LBS	30" WIDE	WT. (LBS)
34"	JB01	19	JB04	20	JB07	23
47"	JB02	23	JB05	24	JB08	29
59"	JB03	30	JB06	31	JB09	36

SOME UNITS SHIP UNASSEMBLED FOR REDUCED SHIPPING COST. ALL DIMENSIONS ARE TYPICAL. TOLERANCE +/- .500" John Boos & Co. is constantly engaged in a program of improving products and therefore reserves the right to change specifications without prior notice.



3601 S. Banker St. • Effingham, IL 62401 • PO BOX 609 • quotes@johnboos.com

www.johnboos.com

From:

To:

02/02/2017

Project:

Graceland/Holabird

ITEM# 46 - LOCKERS (1 EA REQ'D)

Custom CUSTOM

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 47 - SOILED DISHTABLE W/. PRE-RINSE SINK (1 EA REQ'D)

Aero 3SD-L-60

Delux^m Soiled Dishtable, straight design, 60"W x 30"D x 40"H, left-to-right operation, 16/304 stainless steel top, 7"H backsplash with 2" sanitary return, 8" O.C. splash mount faucet holes, 20" wide x 20" front-to-back x 5" deep fabricated pre-rinse sink, fully welded stainless steel gussets, 16/304 stainless steel legs & side cross bracing, adjustable white metal feet, Aero Hemmed Safety Edge m , KD, NSF

ACCESSORIES

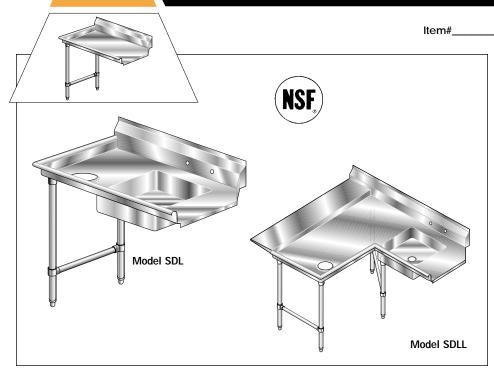
Mfr	Qty	Model	Spec
T&S Brass	1	B-0133-EE-CR-8C	Pre-Rinse Unit, 8" c/c wall mount, 1/2"NPT 00EE
			Male Inlets, B-0108-C spray valve, ceramas

Aero 3SD-L-60 Item #47



SOILED, LEFT HAND DISHTABLES

SDL/SDCL/SDIL, SDL, USDL SERIES



Quantity Model # Model # SOILED, STRAIGI tt dishtables 3SD-L-30 2SD-L-30 3SD-L-36 2SD-L-36 3SD-L-48 2SD-L-48 2SD-L-60 3SD-L-60 3SD-L-72 2SD-L-72 2SD-L-84 3SD-L-84 3SD-L-96 2SD-L-96 3SD-L-120 2SD-L-120

AEROSPEC

2SD-L-144

Project

SOILED, CORNER

3SD-L-144

3SDC-L-48	2SDC-L-48
 3SDC-L-60	2SDC-L-60
 3SDC-L-72	2SDC-L-72
 3SDC-L-84	2SDC-L-84
 3SDC-L-96	2SDC-L-96
 3SDC-L-120	2SDC-L-120
 3SDC-L-144	2SDC-L-144

SOILED, ISLAND DISHTABLES

3SDI-L-48	2SDI-L-48
3SDI-L-60	2SDI-L-60
 3SDI-L-72	2SDI-L-72
 3SDI-L-84	2SDI-L-84
 3SDI-L-96	2SDI-L-96
 3SDI-L-120	2SDI-L-120
3SDI-L-144	2SDI-L-144

SOILED, ISLAND DISHTABLES with Landing Shelf

3SDL-L-48	2SDL-L-48
 3SDL-L-60	2SDL-L-60
 3SDL-L-72	2SDL-L-72
 3SDL-L-84	2SDL-L-84
 3SDL-L-96	2SDL-L-96
 3SDL-L-120	2SDL-L-120
 3SDL-L-144	2SDL-L-144

3USD-L-48	2USD-L-48
3USD-L-60	2USD-L-60
3USD-L-72	2USD-L-72

MATERIAL DISHTABLE

3CD – 16 gauge 304 stainless steel. 2CD – 14 gauge 304 stainless steel.

LEGS

■ 1%" O.D. 16 gauge 304 series stainless steel tubing, complete with 1" adjustable, impact resistant, white metal feet.

CROSSBRACING

■ 1%" O.D. 16 gauge 304 series stainless steel crossbracing, 1%" I.D. aluminum castings at all intersections

DESIGN FEATURES

- All dishtables have a ¾" radius at all intersecting planes (consultant's spec).
- All dishtables fully cartoned.

EXCLUSIVE AERO SAFETY EDGE

Table hemmed on the roll and backsplash to eliminate cuts from rough edges.

CONSTRUCTION

- EXCLUSIVE CUSTOM STYLE 20" x 20" x 5" DEEP FABRICATED BOWL FOR TRUE GAUGE INTEGRITY.
- Plated gusset is machine welded 360 deg. to a stainless steel triangular plate.
- Gusset plate is fully welded directly underneath the sink for support.
- Polished to a #4 blended finish.

PLUMBING

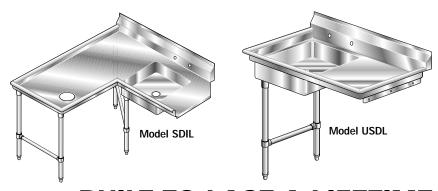
- Water supply is ½" hot and cold.
- Faucet holes are 8" o.c. (splash mount, not included, see accessories).

Includes all of the above and the following:

- Full 10" backsplash instead of standard 7".
- Stainless steel feet in lieu of white metal.

See Accessories page DT-5A for options.

CUSTOM SIZES AVAILABLE



TO LAST A LIFET

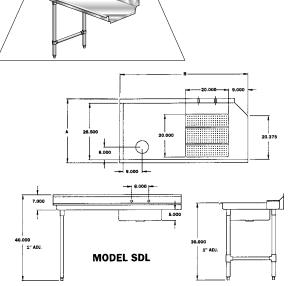
email - sales@aeromfg.com

AERO MANUFACTURING COMPANY • 310 ALLWOOD ROAD, CLIFTON, NEW JERSEY 07012 • VOICE 973.473.5300 FAX 973.473.3794

Model SDCL

DIMENSIONAL SPECIFICATIONS

SDL/SDCL/SDIL, SDL, USDL SERIES

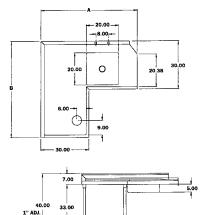


DELUX

AERO

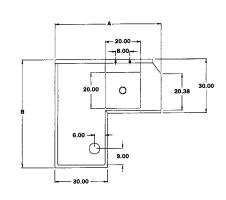
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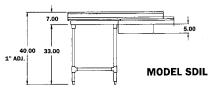
В



Cubic

MODEL SDCL





Width	Length	16GA 430 Model #	14GA 304 Model #	Weight	Feet
SOIL	ED, STR	AIGHT DISH	ITABLES		
30 30	30 36	3SD-L-30 3SD-L-36	2SD-L-30 2SD-L-36	75 83	10 12
30 30	48 60	3SD-L-48 3SD-L-60	2SD-L-48 2SD-L-60	93 105	15 19
30 30	72 84	3SD-L-72 3SD-L-84	2SD-L-72 2SD-L-84	120 130	22 26
30 30	96 120	3SD-L-96 3SD-L-120	2SD-L-96 2SD-L-120	140 152	28 31
30	144	3SD-L-144	2SD-L-144	160	34
SOIL	ED, COF	RNER DISHT	ABLES		
60 60	48 60 72	3SDC-L-48 3SDC-L-60	2SDC-L-48 2SDC-L-60	160 170 180	30 37

AEROSPEC

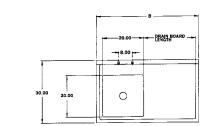
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	.2.00 F	20.00	-		
В	20.00	0		20.37	30.00
	30.00	9.00			

	WILL DIGITI	IDLLO		
48	3SDC-L-48	2SDC-L-48	160	30
60	3SDC-L-60	2SDC-L-60	170	37
72	3SDC-L-72	2SDC-L-72	180	44
84	3SDC-L-84	2SDC-L-84	190	51
96	3SDC-L-96	2SDC-L-96	200	58
120	3SDC-L-120	2SDC-L-120	210	65
144	3SDC-L-144	2SDC-L-144	220	72
FD. ISL	AND DISHTA	BLFS		
			· ·	
	48 60 72 84 96 120 144	48 3SDC-L-48 60 3SDC-L-60 72 3SDC-L-72 84 3SDC-L-84 96 3SDC-L-96 120 3SDC-L-120 144 3SDC-L-144	60 3SDC-L-60 2SDC-L-60 72 3SDC-L-72 2SDC-L-72 84 3SDC-L-84 2SDC-L-84 96 3SDC-L-96 2SDC-L-96 120 3SDC-L-120 2SDC-L-120	48 3SDC-L-48 2SDC-L-48 160 60 3SDC-L-60 2SDC-L-60 170 72 3SDC-L-72 2SDC-L-72 180 84 3SDC-L-84 2SDC-L-84 190 96 3SDC-L-96 2SDC-L-96 200 120 3SDC-L-120 2SDC-L-120 210 144 3SDC-L-144 2SDC-L-144 220

	7.00		
40.00 36.0	0 33.00		5.00
		 	MODEL SDLL

SOIL	ED, ISL	and dishta	BLES		
60	48	3SDI-L-48	2SDI-L-48	160	30
60	60	3SDI-L-60	2SDI-L-60	170	37
60	72	3SDI-L-72	2SDI-L-72	180	44
60	84	3SDI-L-84	2SDI-L-84	190	51
60	96	3SDI-L-96	2SDI-L-96	200	58
60	120	3SDI-L-120	2SDI-L-120	210	65
60	144	3SDI-L-144	2SDI-L-144	220	72



JUIL	ED, ISL	AND DISHIA	DLE3 WITH	Lanuing	Shell
72	48	3SDL-L-48	2SDL-L-48	170	33
72	60	3SDL-L-60	2SDL-L-60	180	45
72	72	3SDL-L-72	2SDL-L-72	190	47
72	84	3SDL-L-84	2SDL-L-84	200	54
72	96	3SDL-L-96	2SDL-L-96	210	62
72	120	3SDL-L-120	2SDL-L-120	220	69
72	144	3SDI _I _144	2SDI _I _144	230	76

SOILED, UNDERCOUNTER

48

60

30

30

30

	ŧ	8.00	
	7.00		=
	5.00		7
40.00	33.00 ADJ.	MODEL USDL	

3USD-L-48 2USD-L-48 95 30 3USD-L-60 2USD-L-60 105 37 *Scrap Hole & Block not Included. 3USD-L-72 2USD-L-72 115 44

All dimensions are typical (tol. $\pm \%$ "). • For Accessories and Options see pages DT-5A & DT-5B. email - sales@aeromfg.com



T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088 Travelers Rest, SC 29690

Model No.

B-0133-EE-CR-8C

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com

		This Spa	ace for Architect/Engineer A	pproval
12 7/16"	ad Tibe	Job Name		Date
[315mm]		Model Specifi	ied	Quantity
4 4		Customer/Wh	nolesaler	
		Contractor		
		Architect/Eng	ineer	
	44" Flexible Stainless	SHAMMAN .	May .	
	Steel Hose w/ Spring & Spray Valve		Managara and a second a second and a second	
	Items Not Shown For Clarity			
	Finger Hook			
	−3/8" NPT x 18" Riser			33 5/16" [846mm]
	EasyInstall Lock Nut & Bushing			
	−Quarter-Turn Cerama Cartridges w/ Check Valves			
	& Lever Handles w/ Color Coded			
<u> </u>	Indexes	5 9/1	6"	2 5/16" [59mm]
3 5/8"	B-0108-C	[141n		
[92mm]	0.65 GPM Low Flow			
	Spray Valve			
	-Ø 2"	- — 14 7/ ∫366n		
8"	[51mm]	[0001]		_ 3/16"
[203mm]	Flanges w/ 1/2" NPT "EE"			[4mm]
Rough-In Requirement:	Male Inlets	Mountin	a Surface	Maximum
(2) Ø 1" [25mm] Mounting Holes		iviourilli	g Surface -	Thickness
Product Specifications: Pre-Rinse Unit: EasyInstall 8" Wall	Mount Mixing Faucet Cerama C	Cartridges	Product Compliance:	105.4
w/ Check Valves, Lever Handles, 4 Spray Valve & 1/2" NPT "EE" Male	14" Flexible Stainless Steel Hose	, 0.65 GPM	ASME A112.18.1 / CSA B1 NSF 61 - Section 9 NSF 372 (Low Lead Conte EPAct 2005 (PRSV) EPA WaterSense (PRSV)	
			<u>`</u>	

Graceland/Holabird

Checked:

JRM

Approved:

JHB

Date:

08/27/15

Scale:

DHL

Drawn:

Page: 123

Sheet: 1 of 2

1:8



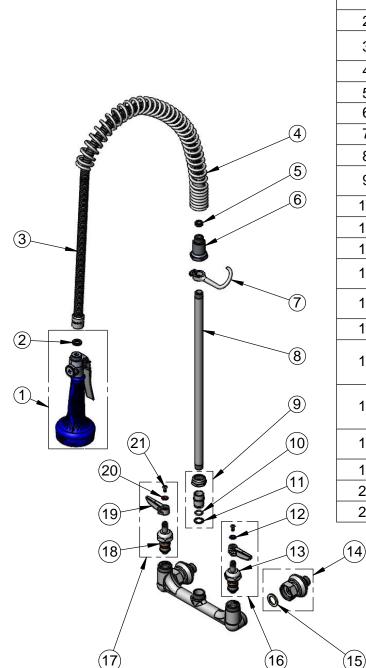
T&S BRASS AND BRONZE WORKS, INC.

2 Saddleback Cove / P.O. Box 1088 Travelers Rest, SC 29690 Model No.

B-0133-EE-CR-8C

Item No.

Travelers Rest, SC: 800-476-4103 • Simi Valley, CA: 800-423-0150 • Fax: 864-834-3518 • www.tsbrass.com



ITEM NO.	SALES NO.	DESCRIPTION
1	B-0108-C	0.65 GPM Low Flow Spray Valve w/ Ergo-Grip
2	001014-45	Washer, B-0100 Hose Barrel
3	B-0044-H2A	44" Flexible Stainless Steel Hose, Less Handle
4	000888-45	EasyInstall Overhead Spring
5	010476-45	#27 Washer
6	000821-40	Spring Body
7	004R	Finger Hook
8	000369-40	3/8" NPT x 18" Riser
9	EZ-K	EasyInstall Kit: Nut, Bushing, O-ring & Lock Washer
10	001065-45	O-Ring
11	014200-45	Star Washer, Anti-Rotation
12	001660-45	Blue Index-CW
13	012395-25	Quarter-Turn Cerama Cartridge, LTC w/ Check Valve
14	00EE	1/2" NPT Male Inlet w/ Adjustable Flange
15	001019-45	Coupling Nut Washer
16	012447-25	Quarter-Turn Cerama Cartridge, LTC w/ Check Valve, Handle, Index & Screw
17	012446-25	Quarter-Turn Cerama Cartridge, RTC w/ Check Valve, Handle, Index & Screw
18	012394-25	Quarter-Turn Cerama Cartridge, RTC w/ Check Valve
19	001638-45	Lever Handle
20	001661-45	Red Index-HW
21	000922-45	Lever Handle Screw

Product Specifications:

Pre-Rinse Unit: EasyInstall 8" Wall Mount Mixing Faucet, Cerama Cartridges w/ Check Valves, Lever Handles, 44" Flexible Stainless Steel Hose, 0.65 GPM Spray Valve & 1/2" NPT "EE" Male Inlets

Product Compliance:

ASME A112.18.1 / CSA B125.1 NSF 61 - Section 9 NSF 372 (Low Lead Content) EPAct 2005 (PRSV) EPA WaterSense (PRSV)

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From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 49 - SPARE NO.

<Spare No.>

From:

To:

02/02/2017

Project: Graceland/Holabird

ITEM# 50 - SPARE NO.

<Spare No.>

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 50 - GLASS RACK OVERSHELF (1 EA REQ'D)

Advance Tabco DT-6R-13-CUSTOM

Sorting Shelf, wall mounted, traditional design, 48"W, accommodates (3) full size dish racks, stainless steel, NSF



DISHTABLE SORTING SHELVES







TRADITIONAL DESIGN FEATURES:

A solid die formed wall mounted rack shelf with solid end brackets.

CONSTRUCTION:

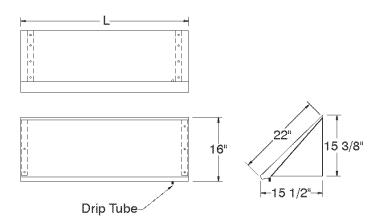
TIG-welded with exposed areas blended to a satin finish.

MATERIAL:

Brackets are 16 gauge type 300 series stainless steel.

Shelf is 16 gauge type 300 series stainless steel.

MODEL #	# of Racks	L	Wt
DT-6R-11	1	22"	20 lbs.
DT-6R-12	2	42"	30 lbs.
DT-6R-13	3	62"	40 lbs.
DT-6R-14	4	82"	50 lbs.





KD TUBULAR DESIGN FEATURES:

A dual purpose open tubular design wall mounted rack shelf with solid end brackets bolted in field. Unit completely knock down.

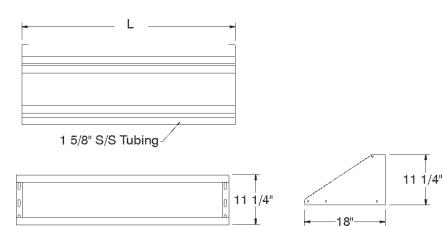
CONSTRUCTION:

No welds. Unit is supplied with assembly hardware.

MATERIAL:

Brackets are 16 gauge type 300 series stainless steel. Tubing is 1 5/8" diameter stainless steel 18 gauge tubing. Stainless steel bolts (included).

MODEL #	# of Racks	L	Wt
DT-6R-21	1	22"	15 lbs.
DT-6R-22	2	42"	23 lbs.
DT-6R-23	3	62"	30 lbs.
DT-6R-24	4	82"	38 lbs.





Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

Email Orders To: customer@advancetabco.com. For Smart Fabrication™ Quotes, Email To: smartfab@advancetabco.com or Fax To: 631-586-2933

NEW YORK Fax: (631) 242-6900 **GEORGIA** Fax: (770) 775-5625

TEXASFax: (972) 932-4795

NEVADA Fax: (775) 972-1578

Q-3



DTA-79 DISHTABLE RACK SHELF & UNDERSHELVES





TABLE MOUNTED TUBULAR, **DOUBLE SIDED DESIGN**

Mounts to backsplash and end roll of dishtable

FEATURES:

A dual purpose double sided open tubular design table mounted rack shelf with solid end plates.

CONSTRUCTION:

All stainless steel posts, cross-tubes & end plates.

Mounts to dishtable with stainless steel bolts Ships Knocked Down*. Easily assembles with simple tool.

MATERIAL:

End Plates are 14 gauge type 304 series stainless steel.

Tubing is 1 5/8" diameter 18 gauge type 300 stainless steel tubing.

CENTER SUPPORT PROVIDED FOR 9' AND LONGER SHELVES

Shelf shipped separated from table to reduce freight costs and chance of shipping damage. Center support can be positioned to accommodate rack size.

MODEL #	Qty.
DTA-79	

Per Linear Foot. Minimum Length 48"



OPTION 1: Lower Angle (Racks cannot be back to back)

When using DTA-79 as a

pass-thru for a glass rack,

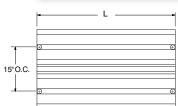
use OPTION 2 (see above).

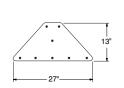
This will allow the rack to pass

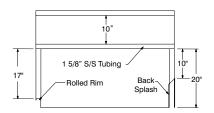


OPTION 2: Higher Angle For back to back storage (For maximum rack storage)









STAINLESS STEEL UNDERSHELVES

FEATURES:

Stainless steel construction featuring the adjustable die cast leg clamp.

CONSTRUCTION:

No welds. Shelf completely die formed.

MATERIAL:

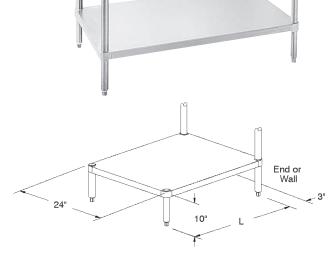
Stainless steel.

MODEL #	L	Wt.
DTA-SS-18	18"	11 lbs.
DTA-SS-24	24"	13 lbs.
DTA-SS-30	30"	15 lbs.
DTA-SS-42	42"	20 lbs.
DTA-SS-54	54"	23 lbs.
DTA-SS-66	66"	30 lbs.

MODEL #		Wt.
DTA-SS-78	78"	35 lbs.
DTA-SS-90	90"	39 lbs.
DTA-SS-102	102"	45 lbs.
DTA-SS-114	114"	50 lbs.
DTA-SS-126	126"	55 lbs.
DTA-SS-138	138"	59 lbs.

Size Undershelf to be at least 6" shorter than dishtable.





ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.

© ADVANCE TABCO, SEPTEMBER 2016

^{*}May ship pre-assembled from factory where special applications exist

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 51 - CAN WASHER (1 EA REQ'D)

IMC Teddy DL-2

Utensil/Can Washer, 16 gauge #304 stainless steel construction., one-piece wash basin, 1" OD stainless steel tubing wash supports, fully welded, removable scrap drawer, integrated 12" backsplash, double foot pedal valve, returnmounted faucet, w/48" flexible stainless steel hose & spray head

Project_______ Consultant______ Model Number______ Item Number______

DL-2 Utensil/Can Washer and Sanitizer

SPECIFICATION:

DL-2 Model Utensil/Can Washer and Sanitizer is constructed of 16gauge #304 stainless steel and consists of a coved wash basin with 1" OD tubular equipment supports and fully integrated outer shell and has a 12" high backsplash. A perforated scrap drawer collects solid waste for disposal periodically. Faucet, T&S #B-1152, or equal, with flexible 48" long stainless steel hose and brush spray head are mounted on top of backsplash. Double foot pedal valve, T&S #B-0502, or equal, mounted on a stainless steel bracket, controls a heavy-duty nozzle spray head with a 360 degree revolving cleaning pattern. Bottom drains to a 2" brass waste outlet. Entire unit is mounted on adjustable stainless steel legs.

PRODUCT GUIDE:

IMC Utensil/Can Washer and Sanitizers are easily cleanable without the use of tools. All corners are coved, and all seams are fully welded and polished.

Compact design with multiple features is ideal for cleaning and washing all large and medium sized utensils and cans or pots. Faucet is used for pot filling or cleaning. Spray brush head helps loosen solid waste. Built-in nozzle spray head at the bottom provides a powerful cleaning cycle. Scrap tray is emptied and cleaned easily.

OPTIONS:

☐ Seismic, bolt-down legs

□ Correctional Package





*Price Page 70

Specifications subject to change without notice.



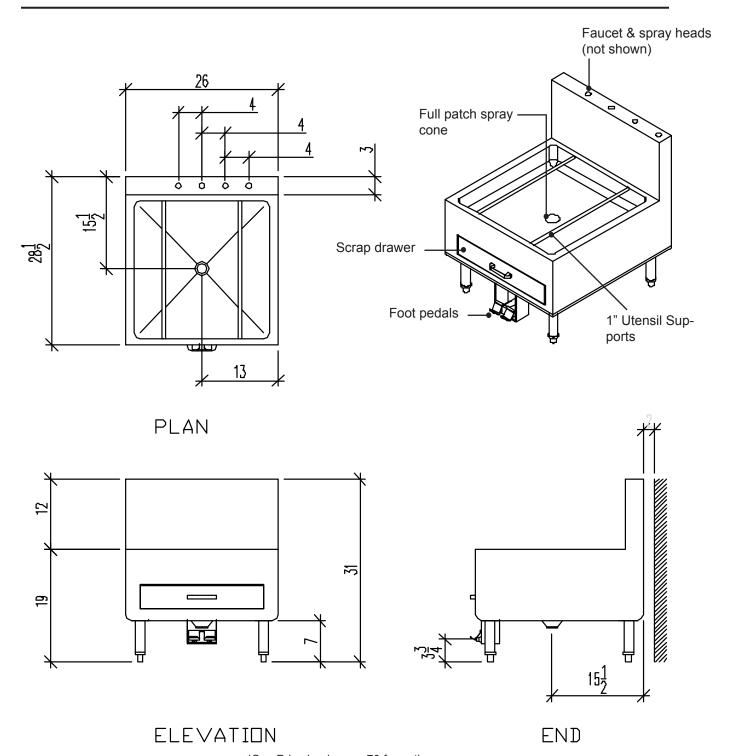
P.O. Box 206 Copiague, NY 11726-0206

www.imcteddy.com

800-221-5644/631-789-8881 Fax: 631-789-3633

DL-2-30 1007

DL-2 Utensil/Can Washer and Sanitizer



*See Price book page 70 for options.

Specifications subject to change without notice.



P.O. Box 206 Copiague, NY 11726-0206 800-221-5644/631-789-8881 Fax: 631-789-3633

DL-2-30 1007

www.imcteddy.com

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 51 - SOAK SINK (1 EA REQ'D)

John Boos PB-SOSINK18-20H

Soak Sink, mobile, 20" working height, $18" \times 18" \times 8"$ deep fabricated sink compartment, no drip edge, twist lever waste, 16/304 stainless steel construction, 5" swivel casters, NSF

John Boos PB-SOSINK18-20H Item #51



"PB-SOSINK" Mobile Sink & Silver Soak Sink

One Compartment Mobile Sink w/ Stainless Steel Base



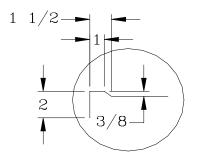


16 ga. 304 S/S WELDED BOWLS

20" HIGH		34" HIGH	
16 Gauge	Qty	16 Gauge	Qty
PB-SOSINK18-H20		PB-SOSINK18-H34	
PB-SOSINK20-H20		PB-SOSINK20-H34	
PB-SOSINK24-H20		PB-SOSINK24-H34	

Bowl Sizes:

18" X 18" 20" X 20" 24" X 24"



marine edge detail view

FEATURES:

- * Standard 16 Gauge Stainless Steel Construction Type 304 stainless steel with # 3 polish, satin finish
- * 8" Deep, 16 Gauge Stainless Steel Bowls Type 304 stainless steel with #3 polish, satin finish
- * All Corners, both vertical and horizontal, coved at 5/8" radius
- * Bottoms of bowls formed for drainage to 3-1/2" diameter die stamped opening
- * Top is finished with a 1-1/2" x 1" No- Drlp Edge, with a 2" turn down on all sides
- * Standard legs 1-5/8" diameter, 16 gauge stainless steel Type 304 stainless steel with #3 polish, satin finish
- * Legs located directly under sink bowls, providing increased stability and maximum weight support
- * Large **Swivel Caster** to insure versatile mobility
- * Twist Lever Waste for easy clean in remote operations

CONSTRUCTION:

Stainless Steel Sinks are TIG welded, Exposed welds Top:

are polished to match adjacent surface.

Bases: Stainless Steel Bases are MIG welded

MATERIAL:

Bowls & 16 gauge stainless Steel

Top: Type 304 stainless steel with #3 polish, satin finish 1 5/8" Round O.D., 16 gauge stainless steel Legs:

Type 304 stainless steel with #3 polish, satin finish

Bracing: 1 1/4" Round O.D., 16 gauge stainless steel

Type 304 stainless steel with #3 polish, satin finish

Gussets: Stainless Steel Caster: 5" Swivel

OPTIONAL ACCESSORIES

	Qty
POT RACK	
SIDE SPLASHS, RIGHT , LEFT or BOTH	

John Boos & Co

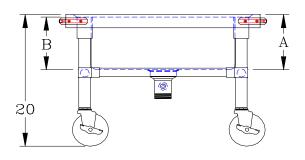
315 South First Street - Effingham, IL 62401 Phone: 217-347-7701 - Fax: 217-347-7705

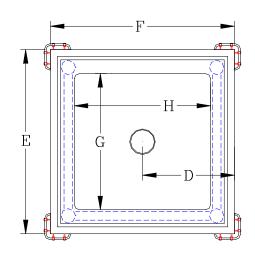
Email: sales@johnboos.com - Web-site: www. johnboos.com

DETAILED SPECIFICATIONS

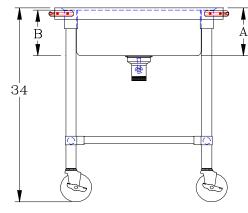
	20"	34"
Α	8-3/8"	8-3/8"
В	8"	8"
С	20"	34"

BOWLS	D	E	F	G	Н
18 X 18	12-1/2"	25"	25"	18"	18"
20 X 20	13-1/2"	27"	27"	20"	20"
24 X 24	15-1/2"	31"	31"	24"	24"

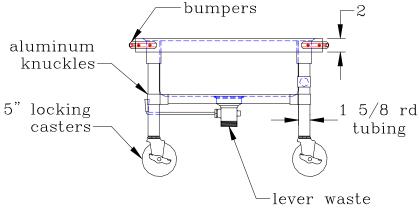




STANDARD 16 GAUGE 20" HIGH					
MODEL	BOWL SIZE	DIMENSIONS	WT.		
PB-SOSINK18-H20	18 X 18 X 8	25" X 25" X 20"			
PB-SOSINK20-H20	20 X 20 X 8	27" X 27" X 20"			
PB-SOSINK24-H20	24 X 24 X 8	31" X 31" X 20"			



STANDARD 16 GAUGE 34" HIGH					
MODEL	BOWL SIZE	DIMENSIONS	WT.		
PB-SOSINK18-H34	18 X 18 X 8	25" X 25" X 20"			
PB-SOSINK20-H34	20 X 20 X 8	27" X 27" X 20"			
PB-SOSINK24-H34	24 X 24 X 8	31" X 31" X 20"			



All dimensions are typical.

Tolerance +/- .500".

All units ship unassembled for reduced shipping cost.

John Boos & Co

315 South First - Effingham, IL 62401 Phone: 217-347-7701 - Fax: 217-347-7705 Email: sales@johnboos.com - Web-site: www.johnboos.com



May 2002

John Boos is constantly engaged in a program of improving products and therefore reserves the right to change specification without prior notice

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 52 - DISHWASHER, DOOR TYPE (1 EA REQ'D)

Hobart PW10ER-1

Advansys™ Ventless Pot/Pan/Utensil Washer with Energy Recovery, front loading with split door design, (10) pan capacity, over/under rotating arms, 2/4/6 minute adjustable timer, up to (13) racks/hour, includes: (1) flat grid, (1) tray rack & (1) flat bottom rack, pre-rinsespray hose, sanitizing with Sense-A-Temp™ 70° booster rise, internal condensing system, auto delime notification, vent fan control, stainless steel construction, 208-240v/60/3-ph, cULus, NSF, ENERGY STAR®

ACCESSORIES

Mfr	Qty	Model	Spec		
Hobart	1		1 Standard warranty - 1-Year parts, labor &		Standard warranty - 1-Year parts, labor & travel
			time during normal working hours within the USA		

Item #52 Hobart PW10ER-1

пспт#_

Quantity_

C.S.I. Section 11400

HOBART

701 S Ridge Avenue, Troy, OH 45374 1-888-4HOBART • www.hobartcorp.com

PW10/PW10eR **DISHMACHINE**

STANDARD FEATURES

- Racks per hour 2 Minute 4 Minute 6 Minute Wash Wash Wash PW10 20 12 8 PW10eR 13 9 7
- 1.2 gallons of water per cycle
- Timed wash cycles for 2-4-6 minutes
- Hot water sanitation machines
- Steam Elimination and Energy Recovery (Advansys only)
- Sense-A-Temp[™] booster heater capable of 70° rise
- Front loading, split-door configuration
- Chamber accepts 10 full-sized sheet pans, or 140 quart mixing bowl
- Advanced Service diagnostics
- Advanced Delime notification and cycle (includes booster) (Advansys only)
- 16 gauge stainless steel deep drawn tank
- Microcomputer controls with advanced digital cycle/temperature display
- Two revolving upper and lower anti-clogging wash arms and rinse arms
- Removable stainless steel scrap screens and scrap basket
- Corrosion resistant pump
- Automatic pumped drain
- Pumped rinse
- 33.79" door opening
- Automatic fill
- Delime pump standard (Advansys)
- Electric tank heat
- Spray hose

STANDARD VOLTAGES

- **208/60/3**
- **480/60/3**

MODELS

- □ PW10
- □ PW10eR

ACCESSORIES

- Pressure regulator valve
- DWT-PW drain water tempering kit

Specifications, Details and Dimensions on Inside and Back.











F40422 - PW10/PW10eR Dishmachine

Page 1 of 4

PW10/PW10eR DISHMACHIN

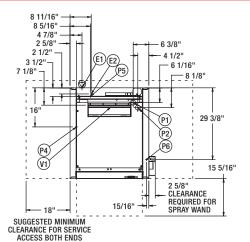
Graceland/Holabird

Page: 137

PW10 DISHMACHINE



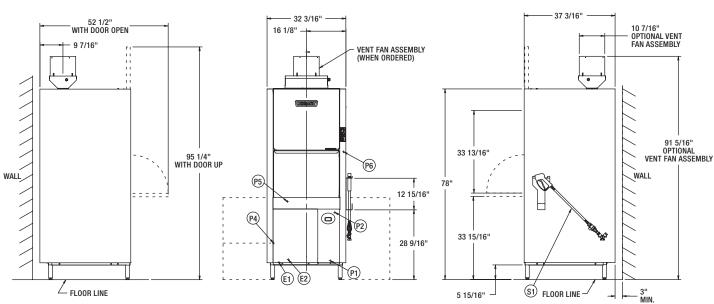
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▲ WARNING

Electrical and grounding connections must comply with the applicable portions of the National Electrical Code and/or other local electrical codes.

Plumbing connections must comply with applicable sanitary, safety and plumbing codes. Drain and fill line configurations vary, some methods are shown on this drawing.



PLUMBING NOTES:

Required flowing water pressure to the dishmachine is 15-65 PSIG. If pressures higher than 65 PSIG are present, a pressure regulating valve must be installed in the water line to the dishmachine (by others). Recommended water hardness to be 3 grains or less for best results. Pressure gauge not required on pumped rinse machines.

MISCELLANEOUS NOTES:

Backflow prevention provided by NSF-approved air gap device

Single point electrical connection machines.

All dimensions taken from floor line may increase 1-1/2" depending on leg adjustment.

Net weight of machine: 324 LBS. Domestic shipping weight: 387 LBS.

Shipping dimensions: 79-1/8"H X 40-1/4"W X 40"D.

Size of racks:

23-3/4" X 26-5/8" X 2-1/4"

(*AFF - ABOVE FINISHED FLOOR)

LEGEND

ELECTRICAL CONNECTION (INCLUDING ELECTRIC HEAT) 1-1/4" CONDUIT HOLE, 7-1/16" AFF.

CONNECTION INFORMATION

- E2 ELECTRICAL CONNECTION: DETERGENT/RINSE AGENT FEEDERS; 8-3/16" AFF.
- P1 HOT WATER CONNECTION INCOMING: 110°F WATER MIN. 3/4" FEMALE GARDEN HOSE FITTING ON 6' LONG HOSE SUPPLIED WITH MACHINE. 7-3/4" AFF.
- P2 DRAIN CONNECTION: 7/8" BARB FITTING, 27-3/8" AFF. 6' LONG 7/8" HOSE SUPPLIED WITH MACHINE.
- P4 DETERGENT PROBE SENSOR; 14-11/16" AFF.
- P5 DETERGENT FEEDER; 31-15/16" AFF.
- P6 RINSE AGENT FEEDER: 52-5/16" AFF.
- VENT EXIT: 4-9/16" X 17-3/8" EXHAUST (STANDARD) TO ALLOW FOR EXPANSION OF AIR (NEED NOT BE CONNECTED TO EXTERNAL VENT): IF REQUIRED VENT FAN ASSEMBLY TO PROVIDE 400 CFM EXHAUST.
- S1 110°F MIN., 3/4" FEMALE GARDEN HOSE TEE FITTING ON 12' LONG HOSE SUPPLIED WITH MACHINE. MOUNTABLE ON EITHER SIDE.

MODEL: PW10 ELECTRIC 00-950647 REV B

RATED AMPS	MINIMUM SUPPLY CIRCUIT CONDUCTOR AMPACITY	MAXIMUM Overcurrent Protective Device
47.6	60	60
53.0	70	70
28.6	35	35
	47.6 53.0	AMPS CIRCUIT CONDUCTOR AMPACITY 47.6 60 53.0 70



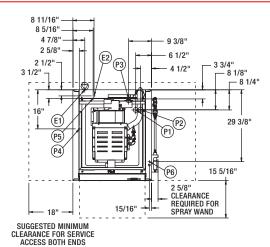
701 S Ridge Avenue, Troy, OH 45374 1-888-4HOBART • www.hobartcorp.com

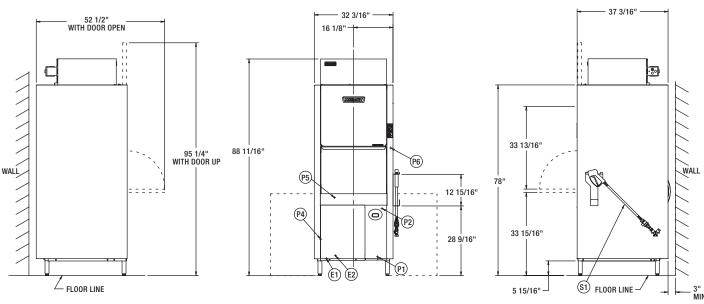
PW10eR **DISHMACHINE**

WARNING

Electrical and grounding connections must comply with the applicable portions of the National Electrical Code and/or other local electrical codes.

Plumbing connections must comply with applicable sanitary, safety and plumbing codes. Drain and fill line configurations vary, some methods are shown on this drawing.





PLUMBING NOTES:

Required flowing water pressure to the dishmachine is 15-65 PSIG. If pressures higher than 65 PSIG are present, a pressure regulating valve must be installed in the water line to the dishmachine (by others).

Recommended water hardness to be 3 grains or less for best results.

Pressure gauge not required on pumped rinse machines.

MISCELLANEOUS NOTES:

Backflow prevention provided by NSF-approved air gap device Single point electrical connection machines.

APPROXIMATE HEAT GAIN TO SPACE WITHOUT VENT HOOD					
MODEL	VOLTAGE	TYPE	BTU/HR		
	208	LATENT	16,200		
PW10eR	200	SENSIBLE	10,000		
1 11 10011	240/480	LATENT	20,100		
	240,400	SENSIBLE	12,300		

Vent hood is not required due to internal condensing system. All dimensions taken from floor line may increase 1-1/2" depending on leg adjustment.

Net weight of machine: 512 LBS. Domestic shipping weight: 575 LBS.

Shipping dimensions: 89-3/4"H X 40-1/4"W X 40"D.

Size of racks: 23-3/4" X 26-11/16" X 2-1/4"

CONNECTION INFORMATION (*AFF - ABOVE FINISHED FLOOR)

LEGEND

- E1 ELECTRICAL CONNECTION (INCLUDING ELECTRIC HEAT) 1-1/4" CONDUIT HOLE, 7-1/16" AFF.
- E2 ELECTRICAL CONNECTION: DETERGENT/RINSE AGENT FEEDERS; 8-3/16" AFF
- P1 HOT WATER CONNECTION INCOMING: 110°F WATER MIN. 3/4" FEMALE GARDEN HOSE FITTING ON 6' LONG HOSE SUPPLIED WITH MACHINE. 7-3/4" AFF.
- P2 DRAIN CONNECTION: 7/8" BARB FITTING, 27-1/2" AFF. 6' LONG 7/8" HOSE SUPPLIED WITH MACHINE.
- P3 COLD WATER CONNECTION INCOMING: 90°F WATER MAX. (65°F OPTIMAL), 3/4" FEMALE GARDEN HOSE FITTING ON 6' LONG HOSE SUPPLIED WITH MACHINE. 7-3/4" AFF.
- P4 DETERGENT PROBE SENSOR; 14-11/16" AFF.
- P5 DETERGENT FEEDER; 31-15/16" AFF.
- P6 RINSE AGENT FEEDER: 52-5/16" AFF.
- S1 110°F MIN., 3/4" FEMALE GARDEN HOSE TEE FITTING ON 12' LONG HOSE SUPPLIED WITH MACHINE. MOUNTABLE ON EITHER SIDE.

ELEC. SPECS.	RATED AMPS	MINIMUM SUPPLY CIRCUIT CONDUCTOR AMPACITY	MAXIMUM OVERCURRENT PROTECTIVE DEVICE
208/60/3	47.6	60	60
240/60/3	53.0	70	70
480/60/3	28.6	35	35

MODEL: PW10eR ELECTRIC 00-950647 REV B

PW10/PW10eR DISHMACHINE



SPECIFICATIONS

DESIGN: Heavy duty, fully automatic, front opening Prep Washer with split-door system. Upper door section slides upward as the lower door section is pulled down. Stainless steel pull-out rack allows easy loading for large utensils and pans. Three variable wash cycles ensure thorough cleaning and sanitizing

CONSTRUCTION: Stainless steel tank and chamber, door, frame, legs and adjustable feet.

PUMP: Pump capacity 211 gpm.

MOTOR: 208-240/60/3 or 480/60/3 configurations. Factory sealed lubrication, TEFC with sealed ball bearings. Thermal overload protection.

WASH AND RINSE CYCLE: Complete automatic type, controlled by microprocessor electronics. Cycle may be interrupted any time by opening door. Cycle continues when door is closed.

Initial cycle fills wash tank, to be recirculated each wash cycle.
 Some wash water is drained off before rinse cycle. Rinse cycle refreshes wash water and tank heat.

RINSE PUMP: Powered by a 1/3 H.P. 3Ø TEFC motor, the rinse pump is made of high strength engineered composite material.

BLOWER: The condenser blower is an all stainless steel forward curved centrifugal wheel powered by a $\frac{1}{16}$ H.P. TEFC single phase motor for nearly silent operation.

CONDENSER COIL: The condensing system using a tube and fin coil constructed of copper and corrosion resistant aluminum.

ELECTRIC BOOSTER HEATER: Electric booster with Sense-A-Temp™ technology adequately sized to raise 110° inlet water to 180°.

CYCLE OPERATION:

PW10eR: The microcomputer-timing program is started by closing the doors and actuating the wash cycle button. The microcomputer energizes the wash pump motor contactor during the wash portion of the program. After the wash, a dwell permits the upper wash manifold to drain. At the end of the dwell, the final rinse pump is energized. After the final rinse pump turns off, the Blower and Cold Water Valve turn on for 120 seconds to condense the vapor laden air inside the chamber. After 120-140 seconds is complete the Cycle Light turns OFF, completing the program.

PW10: The microcomputer-timing program is started by closing the doors and actuating the wash cycle button. The microcomputer energizes the wash pump motor contactor during the wash portion of the program. After the wash, a dwell permits the upper wash manifold to drain. At the end of the dwell, the final rinse pump Is energized. After the final rinse pump turns off, Sani-Dwell permits sanitization to continue, completing the cycle.

RINSE AND SANITATION:

 PW10/10eR: Sanitation is accomplished by means of a builtin booster heater designed to raise temperature of water to a minimum of 180°F from an incoming water temperature of 110°F for PW10 and 55°F for PW10eR.

ENERGY RECOVERY: Heat energy is recovered from the condensation of vapors in the chamber at the end of each cycle. This pre-heats the water for the next rinse cycle from 55°F up to 140°F.

PUMPED DRAIN: Machine automatically drains water through a built-in pump. Maximum 38" drain height permitted.

RACKING: Standard rack assortment consists of one flatbottomed frame rack, one flat grid insert rack and one tray support insert rack.

SPECIFICATIONS: Listed by Underwriters Laboratories Inc. and NSF International.

		PW10			PW10eR		
MACHINE RATINGS	2 Minute Wash	4 Minute Wash	6 Minute Wash	2 Minute Wash	4 Minute Wash	6 Minute Wash	
Racks per Hour Rate	20	12	8	13	9	7	
Tank Capacity - Gallons		,	21 ga	allons		,	
Overall Dimensions - H x W x D	78.04" H	x 34.86" W >	37.20" D	88.47" H	x 34.86" W >	37.20" D	
Wash Cycle Time - Minutes			2, 4, 6	minutes			
Water Usage Per Cycle - Gallons	1.2 gallons						
Drain Design	Pumped						
Door Opening Height x Width	33.79" H x 26.185" W						
Chemical Connection Capability	Standard						
Delime Pump	N/A Standard		Standard				
Peak Drain Flow - GPM			1	8			
Advanced Service Diagnostics	N/A Standard						
Advanced Cleaning Cycle	N/A Standard						
70° Rise Sense-A-Temp™ Booster Heater	Standard						
Incoming Water Temperature Required (minimum)	110° 55°						

As continued product improvement is a policy of Hobart, specifications are subject to change without notice.

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 53 - CONDENSATE HOOD (1 EA REQ'D)

John Boos C2H-36-2

Condensate Hood, 36"W x 36"D x 19"H, full perimeter gutter with drain, starting exhaust duct collar, 3/8" dia. x 2" rear drain tube, welded hanging brackets, 18/300 series stainless steel construction



ITEM #:	QTY:
MODEL#:	
PROJECT NAME:	

3601 S. Banker St. Effingham, IL 62401 • P.O. BOX 609 • Ph: (888) 431-2667 • Fax: (800) 433-2667

"C2H" CONDENSATE HOOD

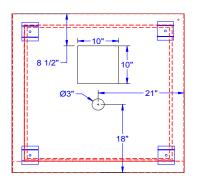
FEATURES:

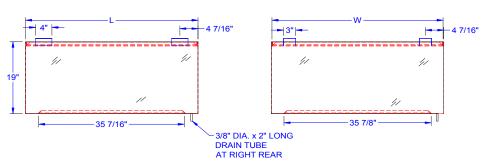
- 18 GAUGE STAINLESS STEEL CONSTRUCTION
- FULL PERIMETER GUTTER
- STARTING EXHAUST DUCT COLLAR
- · WELDED HANGING BRACKETS

MATERIAL:

- HOOD: 18 GAUGE TYPE 300 STAINLESS STEEL
- BAFFLE: 18 GAUGE TYPE 300 STAINLESS STEEL







CONDENSATE HOOD

MODEL #	LENGTH	WIDTH	HEIGHT	WT. (LBS)	QTY
C2H-36-2	36"	36"	19"	38	
C2H-42-2	42"	42"	19"	42	

WEIGHTS ARE SUBJECT TO ADDITIONAL PACKAGING

SOME UNITS SHIP UNASSEMBLED FOR REDUCED SHIPPING COST. ALL DIMENSIONS ARE TYPICAL. TOLERANCE +/- .500" John Boos & Co. is constantly engaged in a program of improving products and therefore reserves the right to change specifications without prior notice.

HARDWOODS KCL STREET ST

278

3601 S. Banker St. • Effingham, IL 62401 • PO BOX 609 • quotes@johnboos.com

www.johnboos.com

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 54 - CLEAN DISHTABLE (1 EA REQ'D)

Aero 3CD-R-36

Delux™ Clean Dishtable, straight design, 36"W x 30"D x 40"H, left-to-right operation, 16/304 stainless steel top, 7"H backsplash with 2" sanitary return, raised rolled edges on front & side, fully welded stainless steel gussets, 16/304 stainless steel legs & adjustable crossbracing, adjustable stainless steel feet, Aero Hemmed Safety Edge™, KD, NSF

Aero 3CD-R-36 Item #54

CLEAN, RIGHT HAND DISHTABLES AERO CDR/CDCR/CDIR/STB SERIES Item# Project DELUX Quantity Model # AEROSPEC Model # DISI NSF 3CD-R-24 2CD-R-24 3CD-R-30 2CD-R-30 3CD-R-36 2CD-R-36 3CD-R-48 2CD-R-48 3CD-R-60 2CD-R-60 2CD-R-72 3CD-R-72 3CD-R-84 2CD-R-84 3CD-R-96 2CD-R-96 2CD-R-120 3CD-R-120 3CD-R-144 2CD-R-144 ER DISHTABLES CLEAN, CORNE 3CDC-R-48 2CDC-R-48 Model CDR 2CDC-R-60 3CDC-R-60 3CDC-R-72 2CDC-R-72 3CDC-R-84 2CDC-R-84 3CDC-R-96 2CDC-R-96 3CDC-R-120 2CDC-R-120 3CDC-R-144 2CDC-R-144 LEAN, ISLAN DISHTABLES 3CDI-R-48 2CDI-R-48 3CDI-R-60 2CDI-R-60 3CDI-R-72 2CDI-R-72 3CDI-R-84 2CDI-R-84 **MATERIAL** 3CDI-R-96 2CDI-R-96 **DISHTABLE** 3CDI-R-120 2CDI-R-120 3CD - 16 gauge 304 stainless steel. 3CDI-R-144 2CDI-R-144 2CD – 14 gauge 304 stainless steel. **LEGS** ■ 1%" O.D. 16 gauge 304 series stainless steel 3STB-48 tubing, complete with 1" adjustable, impact 3STB-60 resistant, white metal feet. Model CDCR 3STB-72 **CROSSBRACING** 3STB-84 ■ 1¼" O.D. 16 gauge 304 series stainless steel crossbracing, 1¾" I.D. aluminum castings at all leg intersections **DESIGN FEATURES** All dishtables have a ¾" radius at all intersecting planes (consultant's spec). All dishtables fully cartoned. **EXCLUSIVE AERO SAFETY EDGE** ■ Table hemmed to eliminate cuts from rough edges. CONSTRUCTION Plated gusset is machine welded 360 deg. to a stainless steel triangular plate. Gusset plate is fully welded directly Model underneath the sink for support. **CDIR** Polished to a #4 blended finish. **SORTING TABLE** includes: ■ 16 gauge 304 stainless steel top. 3" high rolled rim 3 sides with 7" backsplash. Stainless steel crossbraced legs 4 sides. OPTIONS ■ T-129 set of 4" HD Casters.

CUSTOM SIZES AVAILABLE • BUILT TO LAST A LIFETIME

Model 3STB

■ D-1 3½" drainhole.

DIMENSIONAL SPECIFICATIONS AERO CDR/CDCR/CDIR/STB SERIES 20.375 7.000 1" ADJ. **Model CDR** 7.00 7.00 30.00 30.00 20.38 40.00 20.38 33.00 1" ADJ. 33.00 1" ADJ. Model CDCR **Model CDIR** 30.00 30.00 **AEROSPEC** В DELUX Ship Cubic A Width Length 16GA 304 14GA 304 Weight Feet Model # Model # CLEA ight dis STRA HTABLES 30 24 3CD-R-24 2CD-R-24 40 8 7.00 30 30 3CD-R-30 2CD-R-30 46 10 30 3CD-R-36 2CD-R-36 36 51 12 2CD-R-48 30 15 48 3CD-R-48 61 30 60 3CD-R-60 2CD-R-60 71 19 40.00 30 72 3CD-R-72 2CD-R-72 85 22 33.00 30 84 3CD-R-84 2CD-R-84 26 100 30 2CD-R-96 96 28 3CD-R-96 105 30 120 3CD-R-120 2CD-R-120 115 31 30 144 3CD-R-144 2CD-R-144 125 35 Model 3STB CLE CO IER DIS ABLES 3CDC-R-48 60 48 2CDC-R-48 120 30 37 60 60 3CDC-R-60 2CDC-R-60 130 72 3CDC-R-72 2CDC-R-72 60 140 44 2CDC-R-84 3CDC-R-84 150 51 60 84 2CDC-R-96 60 96 3CDC-R-96 160 58 120 3CDC-R-120 2CDC-R-120 60 170 65 72 60 144 3CDC-R-144 2CDC-R-144 180 CI F 60 48 3CDI-R-48 2CDI-R-48 120 30 2CDI-R-60 3CDI-R-60 37 60 60 130 60 72 3CDI-R-72 2CDI-R-72 140 44 60 84 3CDI-R-84 2CDI-R-84 150 51 60 96 3CDI-R-96 2CDI-R-96 160 58 2CDI-R-120 120 3CDI-R-120 170 65 60 60 144 3CDI-R-144 2CDI-R-144 180 72 SORT NG 30 51 3STB-48 69 12

All dimensions are typical (tol. $\pm \mbox{\ensuremath{\#}}'').$ • For Accessories and Options see pages DT-5A & DT-5B. email - sales@aeromfg.com

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AERO MANUFACTURING COMPANY • 310 ALLWOOD ROAD, CLIFTON, NEW JERSEY 07012 • VOICE 973473.5300 FAX 973.473.3794

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3STB-60

3STB-72

3STB-84

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 55 - CHEMICAL STORAGE SHELVING (1 EA REQ'D)

Metro 2448NS

Super Erecta® Shelf, wire, 48"W x 24"D, stainless steel finish, plastic split sleeves are included in each carton, NSF ACCESSORIES

Mfr	Qty	Model	Spec
Metro	1	27UPS	Super Erecta® Post, 28-1/2"H, for use with stem casters, stainless finish
Metro	1	4LD	Super Erecta® Stem Caster, swivel, 4"D wheel, 1/2" face, resilient rubber wheel tread, 125 lb. capacity

!	

Job _____

SUPER ERECTA SHELF® WIRE SHELVING

- Unique Design: The open wire design of these shelves minimizes dust accumulation and allows free circulation of air, greater visibility of stored items and greater light penetration.
- Durable Construction: Super Erecta shelves and posts are constructed of heavy-gauge carbon steel or Type 304 stainless steel.
- Choice of Finishes: Super Erecta Brite[™] and chromeplated for dry storage; Metroseal 3[™] with Microban[®] antimicrobial product protection and stainless steel for corrosive environments; and attractive epoxy color options for merchandising applications.
- **Versatile:** Super Erecta Shelf® wire shelving can adapt to your changing needs. By using various accessories, hundreds of shelving configurations become possible.
- Fast, Secure Assembly: SiteSelect™ Posts have a double groove visual guide feature every 8" (203mm), circular grooves at 1" (25mm) increments, and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
- Adjustability: Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
- **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
- Shelf Accessibility: Shelves can be loaded/unloaded easily from all sides This open construction allows maximum use of storage cube.
- Adjustable Feet: Bolt levelers compensate for surface irregularities.

Note: Stainless stationary posts are equipped with stainless steel leveling feet.





*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



InterMetro Industries Corporation North Washington Street Wilkes-Barre, PA 18705 www.metro.com



Wire Shelving

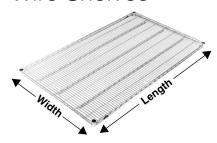
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2448NS Metro Item #55



SUPER ERECTA SHELF® **WIRE SHELVING**

Wire Shelves





Split Sleeve



Aluminum Split Sleeve

- Metroseal 3: Metro's proprietary epoxy coating contains Microban® antimicrobial product protection. Microban antimicrobial protects the epoxy coating from bacteria, mold, mildew, and fungus that cause odors, stains, and product degradation.
- See spec sheet 10.14 for epoxy color options.
- Plastic split sleeves are included with each shelf Replacements are available: Cat. No. 9985 (bag of 4)
- Aluminum split sleeves are recommended for abusive mobile applications and autoclave applications.

Cat. No. 9986Z (bag of 4 with zinc C-rings)

Cat. No. 9986S (bag of 4 with stainless steel C-rings)

Load capacity (evenly distributed) per shelf

Depths: 14" to 24" (355 to 610mm)

800 lbs. (363kg) for lengths of 18" to 48" (457 to 1219mm) 600 lbs. (272kg) for lengths of 54" (1370mm) or longer

• Load capacity (evenly distributed) per unit. Stationary shelving units have a maximum load capacity (evenly distributed) of 2,000 lbs. (907kg)

Mobile units have a maximum capacity of three times the caster load rating up to but not exceeding 1,000 lbs. (453kg) total. Consult the Metro catalog for caster load ratings

• SUPER ERECTA SHELF meets Government Specifications MIL-S-40144E.

Model No.	Model No.	Model No.	Model No.	Nominal Width/Length	Appı Pkd.	Wt.
Super Erecta Brite	Chrome	Metroseal 3 with Microban®	Stainless	(in.) (mm)	(lbs.)	(kg)
1424BR	1424NC	1424NK3	1424NS	14x24 355x610	6	2.7
1430 BR	1430NC	1430NK3	1430NS	14x30 355x760	7	3.2
1436BR	1436NC	1436NK3	1436NS	14x36 355x914	8	3.6
1442BR	1442NC	1442NK3	1442NS	14x42 355x1066	91/2	4.3
1448BR	1448NC	1448NK3	1448NS	14x48 355x1219	101/2	4.7
1460BR	1460NC	1460NK3	1460NS	14x60 355x1524	14	6.3
1472BR	1472NC	1472NK3	1472NS	14x72 355x1829	17	7.7
1824BR	1824NC	1824NK3	1824NS	18x24 457x610	7	3.2
1830BR	1830NC	1830NK3	1830NS	18x30 457x760	8	3.6
1836BR	1836NC	1836NK3	1836NS	18x36 457x914	91/2	4.3
1842BR	1842NC	1842NK3	1842NS	18x42 457x1066	11	5.0
1848BR	1848NC	1848NK3	1848NS	18x48 457x1219	12	5.4
1854BR	1854NC	1854NK3	1854NS	18x54 457x1370	141/2	6.6
1860BR	1860NC	1860NK3	1860NS	18x60 457x1524	17	7.7
1872BR	1872NC	1872NK3	1872NS	18x72 457x1829	20	9.1
2124BR	2124NC	2124NK3	2124NS	21x24 530x610	8	3.6
2130BR	2130NC	2130NK3	2130NS	21x30 530x760	9	4.1
2136BR	2136NC	2136NK3	2136NS	21x36 530x914	11	5.0
2142BR	2142NC	2142NK3	2142NS	21x42 530x1066	12	5.4
2148BR	2148NC	2148NK3	2148NS	21x48 530x1219	14	6.4
2154BR	2154NC	2154NK3	2154NS	21x54 530x1370	16	7.3
2160BR	2160NC	2160NK3	2160NS	21x60 530x1524	18	8.2
2172BR	2172NC	2172NK3	2172NS	21x72 530x1829	24	10.9
2424BR	2424NC	2424NK3	2424NS	24x24 610x610	9	4.1
2430BR	2430NC	2430NK3	2430NS	24x30 610x760	11	5.0
2436BR	2436NC	2436NK3	2436NS	24x36 610x914	13	5.9
2442BR	2442NC	2442NK3	2442NS	24x42 610x1066	15	6.8
2448BR	2448NC	2448NK3	2448NS	24x48 610x1219	16	7.3
2454BR	2454NC	2454NK3	2454NS	24x54 610x1370	19	8.6
2460BR	2460NC	2460NK3	2460NS	24x60 610x1524	21	9.5
2472BR	2472NC	2472NK3	2472NS	24x72 610x1829	26	11.8

Note: 14" (355mm) deep units

Free-standing units: Foot plates should be used and secured to the floor. Mobile units: maximum allowable post height is 54" (1370mm).

SUPER ERECTA SHELF® WIRE SHELVING

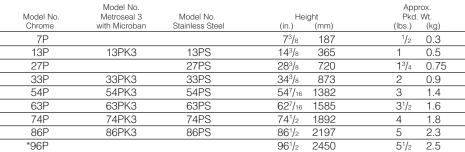


SiteSelect[™] Posts

Stationary Posts

Stationary posts are equipped with a leveling bolt to account for uneven floors.

- Height includes leveling bolt (completely tightened) and post cap Leveling bolt can be adjusted 1/2" (13mm).
- Foot plates may be ordered separately and installed in place of leveling foot.
- Replacement leveling bolts
 Zinc Cat. No. RPF04-004
 Stainless Steel Cat. No. RPF04-004C
- Replacement post cap for standard posts Black Cat. No. RPC06-035



^{*96}P should not be used on units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.

SiteSelect Posts feature double grooves every 8" (203mm) to aid assembly.

Mobile Posts (For use with Stem Casters)

• Height includes post cap.

	Model No.			Approx.
Model No.	Metroseal 3	Model No.	Height	Pkd. Wt.
Chrome	with Microban	Stainless Steel	(in.) (mm)	(lbs.) (kg)
27UP		27UPS	273/4 704	13/4 0.75
33UP	33UPK3	33UPS	33 ³ / ₄ 857	2 0.9
54UP	54UPK3	54UPS	53 ¹³ / ₁₆ 1366	3 1.4
63UP	63UPK3	63UPS	61 ¹³ / ₁₆ 1570	31/2 1.6
	70UPK3		69 ³ / ₄ 1771	3 ³ / ₄ 1.7
74UP	74UPK3	74UPS	73 ⁷ / ₈ 1876	4 1.8
86UP	86UPK3	86UPS	85 ⁷ / ₈ 2181	41/2 2.0

Staked Posts (For use with Truck Dollies)

- Each post connects to the truck dolly through the stem receptacle. The stem receptacle is staked into the bottom of the post to ensure a durable connection in abusive mobile applications.
- Each includes a leveling/connecting bolt.

Model No.	Model No.	Height	Approx. Pkd. Wt.		
Chrome	Stainless Steel	(in.) (mm)	(lbs.) (kg)		
54P-STKD	54PS-STKD	54 ⁷ / ₁₆ 1382	3 1.4		
63P-STKD	63PS-STKD	62 ⁷ / ₁₆ 1585	31/2 1.6		
74P-STKD	74PS-STKD	74 ¹ / ₂ 1892	4 1.8		

Swedged Posts (For use with Stem Casters in Cart Wash Applications)

• Each post has an aluminum cap swedged into the top of the post.

Model No.	Height	Pkd. Wt.		
Stainless Steel	(in.) (mm)	(lbs.) (kg)		
33UPS-SW	33 ³ / ₄ 857	2 0.9		
54UPS-SW	53 ¹³ / ₁₆ 1366	3 1.4		
63UPS-SW	61 ¹³ / ₁₆ 1570	31/2 1.6		

Special Length Posts

Special length cut posts are available. Consult your Metro representative for more information.

Job _____

SUPER ERECTA SHELF® WIRE SHELVING



Super Wide Shelving

- **High-density Storage:** Super Wide[™] shelves have a greater storage area for holding large quantities of supplies, especially large, bulky objects, providing maximum storage in minimum space.
- Load Capacity (evenly distributed) per shelf: Depths: 30" and 36" (760 and 914mm)

600 lbs. (272kg) for lengths 48" (1219mm) or shorter.

	•	•	-	•	•
400 lbs.	(181	kg) for le	ngths 54'	(1370mr	n) or longer.

	Model No.				App	
Model No. Chrome	Metroseal 3 with Microban	Model No. Stainless Steel	Nominal ' (in.)	Width/Length (mm)	Pkd. (lbs.)	Wt. (kg)
3036NC	3036NK3	3036NS	30x36	760x914	15	6.8
3048NC	3048NK3	3048NS	30x48	760x1219		
					21	9.5
3060NC	3060NK3	3060NS	30x60	760x1524	26 ¹ / ₂	11.8
3072NC	3072NK3	3072NS	30x72	760x1829	31	14.0
3636NC	3636NK3	3636NS	36x36	910x914	18	8.2
3648NC	3648NK3	3648NS	36x48	910x1219	23	10.4
3660NC	3660NK3	3660NS	36x60	910x1524	29	13.1
3672NC	3672NK3	3672NS	36x72	910x1829	341/2	15.4



Foot Plates

- Use to bolt units to the floor, or when a broader, more stable foot is desired. Foot plates also help to protect floors by distributing the point load of the shelving unit across a larger contact point.
- Foot plates (completely tightened) add 1/8" (3mm) to the specified heights of each stationary post on the table.

Zinc Cat. No. 9993Z

Stainless Steel Cat. No. 9993S



"S" Hook

Used to add on shelving units with only two posts required. Order two per shelf level.
 Cat. No. 9995Z



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All Metro Catalog Sheets are available on our Web Site: www.metro.com



InterMetro Industries Corporation

North Washington Street, Wilkes-Barre, PA 18705 Phone: 570-825-2741 Fax: 570-825-2852

without notice. Please confirm at time of order.

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Information and specifications are subject to change

For Product Information: Latin America: 1.561.333.3824 U.S. and Canada: 1.800.433.2232 Europe: +31.76.587.7550

Asia/Pacific: +65.6567.8003 Middle East/Africa: +971.4.811.8286

Job _____

SUPER ERECTA SHELF® WIRE SHELVING

- Unique Design: The open wire design of these shelves minimizes dust accumulation and allows free circulation of air, greater visibility of stored items and greater light penetration.
- Durable Construction: Super Erecta shelves and posts are constructed of heavy-gauge carbon steel or Type 304 stainless steel.
- Choice of Finishes: Super Erecta Brite[™] and chromeplated for dry storage; Metroseal 3[™] with Microban[®] antimicrobial product protection and stainless steel for corrosive environments; and attractive epoxy color options for merchandising applications.
- **Versatile:** Super Erecta Shelf® wire shelving can adapt to your changing needs. By using various accessories, hundreds of shelving configurations become possible.
- Fast, Secure Assembly: SiteSelect™ Posts have a double groove visual guide feature every 8" (203mm), circular grooves at 1" (25mm) increments, and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
- Adjustability: Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
- **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
- Shelf Accessibility: Shelves can be loaded/unloaded easily from all sides This open construction allows maximum use of storage cube.
- Adjustable Feet: Bolt levelers compensate for surface irregularities.

Note: Stainless stationary posts are equipped with stainless steel leveling feet.





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Wire Shelving

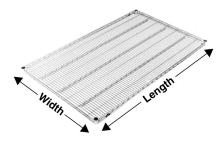
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27UPS Metro Item #55



SUPER ERECTA SHELF® WIRE SHELVING

Wire Shelves





Split Sleeve



Aluminum Split Sleeve

- Metroseal 3: Metro's proprietary epoxy coating contains Microban® antimicrobial product protection. Microban antimicrobial protects the epoxy coating from bacteria, mold, mildew, and fungus that cause odors, stains, and product degradation.
- See spec sheet 10.14 for epoxy color options.
- Plastic split sleeves are included with each shelf Replacements are available: Cat. No. 9985 (bag of 4)
- Aluminum split sleeves are recommended for abusive mobile applications and autoclave applications.

Cat. No. 9986Z (bag of 4 with zinc C-rings)

Cat. No. 9986S (bag of 4 with stainless steel C-rings)

Load capacity (evenly distributed) per shelf

Depths: 14" to 24" (355 to 610mm)

800 lbs. (363kg) for lengths of 18" to 48" (457 to 1219mm) 600 lbs. (272kg) for lengths of 54" (1370mm) or longer

• Load capacity (evenly distributed) per unit. Stationary shelving units have a maximum load capacity (evenly distributed) of 2,000 lbs. (907kg)

Mobile units have a maximum capacity of three times the caster load rating up to but not exceeding 1,000 lbs. (453kg) total. Consult the Metro catalog for caster load ratings

• SUPER ERECTA SHELF meets Government Specifications MIL-S-40144E.

Model No.	Model No.	Model No.	Model No.	Nominal Width/Length	Appi Pkd.	. Wt.
Super Erecta Brite	Chrome	Metroseal 3 with Microban®	Stainless	(in.) (mm)	(lbs.)	(kg)
1424BR	1424NC	1424NK3	1424NS	14x24 355x610	6	2.7
1430 BR	1430NC	1430NK3	1430NS	14x30 355x760	7	3.2
1436BR	1436NC	1436NK3	1436NS	14x36 355x914	8	3.6
1442BR	1442NC	1442NK3	1442NS	14x42 355x1066	91/2	4.3
1448BR	1448NC	1448NK3	1448NS	14x48 355x1219	10 ¹ / ₂	4.7
1460BR	1460NC	1460NK3	1460NS	14x60 355x1524	14	6.3
1472BR	1472NC	1472NK3	1472NS	14x72 355x1829	17	7.7
1824BR	1824NC	1824NK3	1824NS	18x24 457x610	7	3.2
1830BR	1830NC	1830NK3	1830NS	18x30 457x760	8	3.6
1836BR	1836NC	1836NK3	1836NS	18x36 457x914	91/2	4.3
1842BR	1842NC	1842NK3	1842NS	18x42 457x1066	11	5.0
1848BR	1848NC	1848NK3	1848NS	18x48 457x1219	12	5.4
1854BR	1854NC	1854NK3	1854NS	18x54 457x1370	14 ¹ / ₂	6.6
1860BR	1860NC	1860NK3	1860NS	18x60 457x1524	17	7.7
1872BR	1872NC	1872NK3	1872NS	18x72 457x1829	20	9.1
2124BR	2124NC	2124NK3	2124NS	21x24 530x610	8	3.6
2130BR	2130NC	2130NK3	2130NS	21x30 530x760	9	4.1
2136BR	2136NC	2136NK3	2136NS	21x36 530x914	11	5.0
2142BR	2142NC	2142NK3	2142NS	21x42 530x1066	12	5.4
2148BR	2148NC	2148NK3	2148NS	21x48 530x1219	14	6.4
2154BR	2154NC	2154NK3	2154NS	21x54 530x1370	16	7.3
2160BR	2160NC	2160NK3	2160NS	21x60 530x1524	18	8.2
2172BR	2172NC	2172NK3	2172NS	21x72 530x1829	24	10.9
2424BR	2424NC	2424NK3	2424NS	24x24 610x610	9	4.1
2430BR	2430NC	2430NK3	2430NS	24x30 610x760	11	5.0
2436BR	2436NC	2436NK3	2436NS	24x36 610x914	13	5.9
2442BR	2442NC	2442NK3	2442NS	24x42 610x1066	15	6.8
2448BR	2448NC	2448NK3	2448NS	24x48 610x1219	16	7.3
2454BR	2454NC	2454NK3	2454NS	24x54 610x1370	19	8.6
2460BR	2460NC	2460NK3	2460NS	24x60 610x1524	21	9.5
2472BR	2472NC	2472NK3	2472NS	24x72 610x1829	26	11.8

Note: 14" (355mm) deep units.

Free-standing units: Foot plates should be used and secured to the floor. Mobile units: maximum allowable post height is 54" (1370mm).

SUPER ERECTA SHELF® WIRE SHELVING



SiteSelect[™] Posts

Stationary Posts

Stationary posts are equipped with a leveling bolt to account for uneven floors.

- Height includes leveling bolt (completely tightened) and post cap Leveling bolt can be adjusted 1/2" (13mm).
- Foot plates may be ordered separately and installed in place of leveling foot.
- Replacement leveling bolts
 Zinc Cat. No. RPF04-004
 Stainless Steel Cat. No. RPF04-004C
- Replacement post cap for standard posts Black Cat. No. RPC06-035

Model No. Chrome	Model No. Metroseal 3 with Microban	Model No. Stainless Steel	Height (in.) (mm)	Appi Pkd. (lbs.)	
7P			7³/ ₈ 187	1/2	0.3
13P	13PK3	13PS	14³/ ₈ 365	1	0.5
27P		27PS	28 ³ / ₈ 720	13/4	0.75
33P	33PK3	33PS	34 ³ / ₈ 873	2	0.9
54P	54PK3	54PS	54 ⁷ / ₁₆ 1382	3	1.4
63P	63PK3	63PS	62 ⁷ / ₁₆ 1585	$3^{1}/_{2}$	1.6
74P	74PK3	74PS	74¹/₂ 1892	4	1.8
86P	86PK3	86PS	86¹/ ₂ 2197	5	2.3
*96P			961/2 2450	51/2	2.5

^{*96}P should not be used on units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.

SiteSelect Posts feature double grooves every 8" (203mm) to aid assembly.

Mobile Posts (For use with Stem Casters)

• Height includes post cap.

	Model No.			Approx.
Model No.	Metroseal 3	Model No.	Height	Pkd. Wt.
Chrome	with Microban	Stainless Steel	(in.) (mm)	(lbs.) (kg)
27UP		27UPS	273/4 704	13/4 0.75
33UP	33UPK3	33UPS	33 ³ / ₄ 857	2 0.9
54UP	54UPK3	54UPS	53 ¹³ / ₁₆ 1366	3 1.4
63UP	63UPK3	63UPS	61 ¹³ / ₁₆ 1570	31/2 1.6
	70UPK3		69 ³ / ₄ 1771	3 ³ / ₄ 1.7
74UP	74UPK3	74UPS	73 ⁷ / ₈ 1876	4 1.8
86UP	86UPK3	86UPS	85 ⁷ / ₈ 2181	41/2 2.0

Staked Posts (For use with Truck Dollies)

- Each post connects to the truck dolly through the stem receptacle. The stem receptacle is staked into the bottom of the post to ensure a durable connection in abusive mobile applications.
- Each includes a leveling/connecting bolt.

Model No.	Model No.	Height	Approx. Pkd. Wt.
Chrome	Stainless Steel	(in.) (mm)	(lbs.) (kg)
54P-STKD	54PS-STKD	547/16 1382	3 1.4
63P-STKD	63PS-STKD	62 ⁷ / ₁₆ 1585	31/2 1.6
74P-STKD	74PS-STKD	74 ¹ / ₂ 1892	4 1.8

Swedged Posts (For use with Stem Casters in Cart Wash Applications)

• Each post has an aluminum cap swedged into the top of the post.

Model No.	Height	Pkd. Wt.
Stainless Steel	(in.) (mm)	(lbs.) (kg)
33UPS-SW	33³/4 857	2 0.9
54UPS-SW	53 ¹³ / ₁₆ 1366	3 1.4
63UPS-SW	61 ¹³ / ₁₆ 1570	31/2 1.6

Special Length Posts

Special length cut posts are available. Consult your Metro representative for more information.

27UPS

SUPER ERECTA SHELF® WIRE SHELVING



Super Wide Shelving

- High-density Storage: Super Wide[™] shelves have a greater storage area for holding large quantities of supplies, especially large, bulky objects, providing maximum storage in minimum space.
- Load Capacity (evenly distributed) per shelf: Depths: 30" and 36" (760 and 914mm)

600 lbs. (272kg) for lengths 48" (1219mm) or shorter.

400 lbs.	(181kg) for	lengths 54	4" (1370mm)	or longer.
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	0	,	0

Model No.	Model No. Metroseal 3	Model No.	Nominal \	Width/Length	App Pkd.	
Chrome	with Microban	Stainless Steel	(in.)	(mm)	(lbs.)	(kg)
3036NC	3036NK3	3036NS	30x36	760x914	15	6.8
3048NC	3048NK3	3048NS	30x48	760x1219	21	9.5
3060NC	3060NK3	3060NS	30x60	760x1524	26 ¹ / ₂	11.8
3072NC	3072NK3	3072NS	30x72	760x1829	31	14.0
3636NC	3636NK3	3636NS	36x36	910x914	18	8.2
3648NC	3648NK3	3648NS	36x48	910x1219	23	10.4
3660NC	3660NK3	3660NS	36x60	910x1524	29	13.1
3672NC	3672NK3	3672NS	36x72	910x1829	341/2	15.4



Foot Plates

- Use to bolt units to the floor, or when a broader, more stable foot is desired. Foot plates also help to protect floors by distributing the point load of the shelving unit across a larger contact point.
- Foot plates (completely tightened) add 1/8" (3mm) to the specified heights of each stationary post on the table.

Zinc Cat. No. 9993Z

Stainless Steel Cat. No. 9993S



"S" Hook

• Used to add on shelving units with only two posts required. Order two per shelf level. Cat. No. 9995Z



Printed in U.S.A. Rev. 11/08

All Metro Catalog Sheets are available on our Web Site: www.metro.com



InterMetro Industries Corporation

North Washington Street, Wilkes-Barre, PA 18705 Phone: 570-825-2741 Fax: 570-825-2852

without notice. Please confirm at time of order Copyright © 2008 InterMetro Industries Corp.

Information and specifications are subject to change

For Product Information: U.S. and Canada: 1.800.433.2232 Latin America: 1.561.333.3824 Europe: +31.76.587.7550

Asia/Pacific: +65.6567.8003

Middle East/Africa: +971.4.811.8286

Graceland/Holabird

Wire Shelving

Page: 154

Metro

Item #	

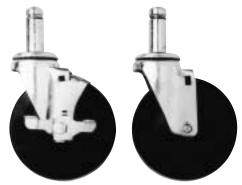
Job _____

METRO® STEM CASTERS

- Metro Stem-Type Casters are designed to fit Super Erecta Shelf® posts to form shelf carts and other mobile units.
- Stainless Steel, Cart-Washable Casters offer grease seals and zerk fittings. Can withstand high-pressure washings.
- **Polymer Horn Casters:** Innovative polymer stem casters offer corrosion resistance and enhanced durability. For all medium-duty applications.
- **Resilient Rubber Tread:** A molded, soft tread that provides good floor protection along with quiet operation. Non-marking.
- **Polyurethane Tread:** Long-wearing; resists abrasion. Non-marking, shock absorbing.
- Wheel Brakes: Foot-operated. Available on all caster models.
- Caster Load Ratings: From 125 lbs. to 300 lbs. (57 to 136kg) See chart.
- **Donut Bumpers:** Furnished standard on all Metro stem casters.
- Additional Caster Types Available.

Note: SPECIAL WHEELS — V-groove, Conductive, Steel and Phenolic — are available on request. For additional information, contact InterMetro Industries Corporation or your InterMetro representative.

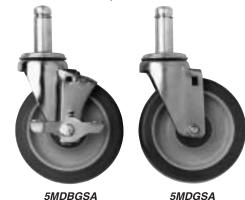
Resilient Rubber



5MB Wheel Brake Includes Donut Bumper (not shown)

5M Resilient Includes Donut Bumper (not shown)

Stainless Steel, Cart Washable



Polymer Horn Casters





InterMetro Industries Corporation

North Washington Street Wilkes-Barre, PA 18705 www.metro.com

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Casters (Stem Type)



METRO® STEM CASTERS



Item #55

Dimensions

Standard Casters — Stem Type

Cat. No.	Dian	neel neter (mm)	F (in.)	ace (mm)	Loa Rati (lbs.)		Туре	Wheel Tread		orox. . Wt. (kg)
4LD	4	102	1/2	12	125	56	Stem/Swivel	Resilient	11/2	.6
5LD	5	127	1/2	12	125	56	Stem/Swivel	Resilient	2	.9
5M	5	127	11/4	32	200	90	Stem/Swivel	Resilient	21/2	1.1
5MB	5	127	1 1/4	32	200	90	Stem/Brake	Resilient	23/4	1.2
5MR	5	127	11/4	32	200	90	Stem/Rigid	Resilient	31/2	1.5
5MDA	5	127	11/4	32	250	111	Stem/Swivel	High Modulus Donut	21/2	1.1
5MDBA	5	127	11/4	32	250	111	Stem/Brake	High Modulus Donut	25/8	1.17
5MDRA	5	127	11/4	32	250	111	Stem/Rigid	High Modulus Donut	23/8	1.08
5MP	5	127	11/4	32	300	135	Stem/Swivel	Polyurethane	21/8	.94
5MPB	5	127	1 ¹ / ₄	32	300	135	Stem/Brake	Polyurethane	21/4	1
5MPR	5	127	11/4	32	300	135	Stem/Rigid	Polyurethane	2	.9

4LD

NOTE 1: Stem casters are shipped with donut bumper at no additional charge.

NOTE 2: Rigid casters are held in position by a connecting channel. When ordering rigid casters, shelf width must be known.

NOTE 3: Load Height for all 5M, 5MD and 5MP casters — $6^3/3x^8 \pm 1/1e^8$ (155 ± 1.5mm).

NOTE 4: Load Height for 4LD caster — $4^5/8x^8 \pm 1/1e^8$ (118 ± 1.5mm).

NOTE 5: Load Height for 5LD caster — $5^5/8x^8 \pm 1/1e^8$ (143 ± 1.5mm).

NOTE 6: Brakes are foot-operated.

Stainless Steel Cart-Washable Casters — Stem Type

	Wh Diam		F	ace	Loa Ratii				App Pkd.	orox. . Wt.
Cat. No.	(in.)	(mm)	(in.)	(mm)	(lbs.)	(kg)	Туре	Wheel Tread	(lbs.)	(kg)
5MDGSA	5	122	1 1/4	32	150	68	Swivel	High Modulus Donut	21/2	1.1
5MDBGSA	5	122	1 1/ ₄	32	150	68	Brake	High Modulus Donut	25/8	1.17
5MDRGSA	5	122	1 1/4	32	150	68	Rigid	High Modulus Donut	$2^{3}/_{8}$	1.08
5MPGSA	5	127	1 1/4	32	300	135	Swivel	Polyurethane	$2^{1}/_{8}$.94
5MPBGSA	5	127	1 1/4	32	300	135	Brake	Polyurethane	$2^{1}/_{4}$	1
5MPRGSA	5	127	1 1/4	32	300	135	Rigid	Polyurethane	2	.9

NOTE 1: Stem casters are shipped with donut bumper at no additional charge.

NOTE 2: Rigid casters are held in position by a connecting channel. When ordering rigid casters, shelf width **must be** known. NOTE 3: Load Height for all 5MD and 5MP casters — 63/s2* ± 1/16* (155 ± 1.5mm).

NOTE 4: All casters are grease sealed with zerk fittings in swivel and axle.

NOTE 5: Brakes are foot-operated.

NOTE 6: "D" in model number designates donut wheel made of high-modulus rubber.

Polymer Casters — Stem Type

Wheel Diameter		Face	Load Rating			App Pkd.	
Cat. No.	(in.) (mm)	(in.) (mm)	(lbs.) (kg)	Туре	Wheel Tread	(lbs.)	(kg)
5PC	5 127	11/4 32	300 135	Swivel	Polyurethane	2	.9
5PCB	5 127	11/4 32	300 135	Brake	Polyurethane	2	.9
5PCR	5 127	11/4 32	300 135	Riaid	Polyurethane	2	.9

NOTE 1: Optional thread guards (blue) may be ordered by adding "-TG" to the desired model number (eg. 5PC-TG, 5PCB-TG, 5PCR-TG). NOTE 2: Stem casters are shipped with donut bumper at no additional charge.

NOTE 3: Rigid casters are held in place by a connecting channel. When ordering, shelf depth must be provided.

Manufactured by:



InterMetro Industries Corporation

North Washington Street, Wilkes-Barre, PA 18705 Phone: 570-825-2741 • Fax: 570-825-2852

For Product Information Call: 1-800-433-2232 Visit Our Web Site: www.metro.com

102-041 Printed in U.S.A.

Information and specifications are subject to change without notice. Please confirm at time of order.

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 56 - THREE (3) COMPARTMENT SINK (1 EA REQ'D)

John Boos 3PB184-2D18

Pro-Bowl Sink, 93-1/4"W x 23-1/2"D, (3) 14" deep bowl compartments 18"W x 24"D, (2) 18" left & right drain board, 10"H boxed backsplash with 45° top & 2" return, (2) 8" O.C. splash mount faucet holes, 16 gauge, 300 stainless steel top/bowl with satin finish, 1-5/8" OD stainless steel legs with 1-1/4" bracing, fully welded front apron, adjustable stainless steel bullet feet, CSA, NSF



ITEM #:	QTY:
MODEL#:	
PROJECT NAME: _	

3601 S. Banker St. Effingham, IL 62401 • P.O. BOX 609 • Ph: (888) 431-2667 • Fax: (800) 433-2667

"3PB-2DB" PRO-BOWL COMPARTMENT SINKS 16GA





3 COMPARTMENT WITH 2 DRAIN BOARD - STAINLESS STEEL BASE

FEATURES:

- STANDARD 16GA TYPE 300 STAINLESS STEEL WITH #4 POLISH, SATIN FINISH
- 12" & 14" DEEP BOWLS
- ALL CORNERS, BOTH VERTICAL AND HORIZONTAL, COVED AT 5/8" RADIUS
- BOTTOMS OF BOWLS FORMED FOR DRAINAGE TO 3-1/2" DIAMETER DIE STAMPED OPENING
- FULL LENGTH 10" HIGH BOXED BACKSPLASH, WITH 2" RETURN TO WALL AT 45 DEGREE AND 3/4" TURNED DOWN REAR LIP
- · 2 SETS OF FAUCET HOLES 8" ON-CENTER
- 1-1/8" FAUCET HOLES IN BACKSPLASH
- SOLID STAINLESS STEEL FRONT PANEL, TYPE 300 STAINLESS STEEL WITH #4 POLISH, SATIN FINISH
- ALL OUTSIDE CORNERS OF ASSEMBLY ARE BULLNOSED TO PROVIDE SAFE, CLEAN, AND POLISHED EDGE

CONSTRUCTION:

406

- TOP: STAINLESS STEEL SINKS ARE TIG WELDED, EXPOSED WELDS ARE POLISHED TO MATCH ADJACENT SURFACE
- · BASE: STAINLESS STEEL BASES, STANDARD K.D.

MATERIAL:

- BOWLS & TOP: 16GA TYPE 300 STAINLESS STEEL WITH #4 POLISH, SATIN FINISH
- LEGS: 1-5/8" ROUND O.D. STAINLESS STEEL
- BRACING: 1-1/4" ROUND O.D. STAINLESS STEEL
- · GUSSETS: STAINLESS STEEL
- FEET: 1" ADJUSTABLE STAINLESS STEEL
 BULLET FEET



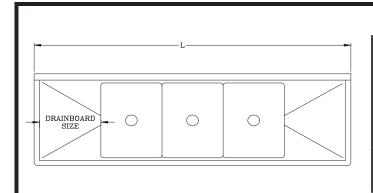
16GA - "3PB-2DB" PRO-BOWL SERIES SINK

12" DEEP	QTY	14" DEEP	QTY
3PB1618-2D18		3PB16184-2D18	
3PB1618-2D24		3PB16184-2D24	
3PB1618-2D30		3PB16184-2D30	
3PB18-2D18		3PB184-2D18	
3PB18-2D24		3PB184-2D24	
3PB18-2D30		3PB184-2D30	
3PB1824-2D18		3PB18244-2D18	
3PB1824-2D24		3PB18244-2D24	
3PB1824-2D30		3PB18244-2D30	
3PB24-2D24		3PB244-2D24	
3PB24-2D30		3PB244-2D30	
3PB3024-2D30		3PB30244-2D30	
3PB3024-2D36		3PB30244-2D36	

OPTIONAL ACCESSORIES

DESCRIPTION	QTY
END SPLASHES, R, L, OR BOTH	
FAUCETS	
ADD-A-FAUCETS	
PRE-RINSE UNITS	
LEVEL WASTE	
OVERSHELVES	
POT RACK	

DETAILED SPECIFICATIONS



BOWL SIZE 16" X 18" 23-1/2" 18" 11-15/16" 16" X 20" 25-1/2" 20" 12-15/16" 18" X 18" 23-1/2" 18" 11-15/16" 18" X 24" 29-1/2" 14-15/16" 24" 24" X 24" 29-1/2" 24" 14-15/16"

29-1/2"

30" X 24"

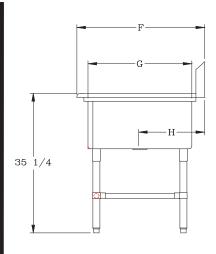
BOWLS

(12" DEEP) 16GA - "3PB-2DB" PRO-BOWL SERIES SINK

MODEL	BOWL SIZE	DIMENSIONS	DB	WT. (LBS)
3PB1618-2D18	16 X 18 X 12	87-1/4" X 23-1/2	18"	123
3PB1618-2D24	18 X 18 X 12	99-1/4" X 23-1/2"	24"	131
3PB1618-2D30	16 X 18 X 12	111-1/4" X 23-1/2"	30"	138
3PB18-2D18	18 X 18 X 12	93-1/4" X 23-1/2"	18"	131
3PB18-2D24	18 X 18 X 12	105-1/4" X 23-1/2"	24"	138
3PB18-2D30	18 X 18 X 12	117-1/4" X 23-1/2"	30"	146
3PB1824-2D18	18 X 24 X 12	93-1/4" X 29-1/2"	18"	148
3PB1824-2D24	18 X 24 X 12	105-1/4" X 29-1/2"	24"	157
3PB1824-2D30	18 X 24 X 12	117-1/4" X 29-1/2"	30"	166
3PB24-2D24	24 X 24 X 12	123-1/4" X 29-1/2"	24"	182
3PB24-2D30	24 X 24 X 12	135-1/4" X 29-1/2"	30"	191
3PB3024-2D30	30 X 24 X 12	153-1/4" X 29-1/2"	30"	216
3PB3024-2D36	30 X 24 X 12	165-1/4" X 29-1/2"	36"	225

(14" DEEP) 16GA - "3PB-2DB" PRO-BOWL SERIES SINK

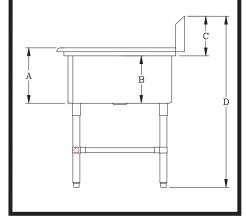
MODEL	DOWL CIZE	DIMENSIONS	D.D.	WT (LDC)
MODEL	BOWL SIZE	DIMENSIONS	DB	WT. (LBS)
3PB16184-2D18	16 X 18 X 14	87-1/4" X 23-1/2"	18"	131
3PB16184-2D24	18 X 18 X 14	99-1/4" X 23-1/2"	24"	139
3PB16184-2D30	16 X 18 X 12	111-1/4" X 23-1/2"	30"	147
3PB184-2D18	18 X 24 X 14	93-1/4" X 23-1/2"	18"	140
3PB184-2D24	24 X 24 X 14	105-1/4" X 23-1/2"	24"	147
3PB184-2D30	18 X 18 X 14	117-1/4" X 23-1/2"	30"	155
3PB18244-2D18	18 X 24 X 14	93-1/4" X 29-1/2"	18"	158
3PB18244-2D24	18 X 24 X 14	105-1/4" X 29-1/2"	24"	167
3PB18244-2D30	18 X 24 X 14	117-1/4" X 29-1/2"	30"	176
3PB244-2D24	24 X 24 X 14	123-1/4" X 29-1/2"	24"	194
3PB244-2D30	24 X 24 X 14	135-1/4" X 29-1/2"	30"	203
3PB30244-2D30	30 X 24 X 14	153-1/4" X 29-1/2"	30"	230
3PB30244-2D36	30 X 24 X 14	165-1/4" X 29-1/2"	36"	239



24"

14-15/16"

	12" DEEP	14" DEEP
А	14"	16"
В	12"	14"
С	10"	10"
D	43"	43"



SOME UNITS SHIP UNASSEMBLED FOR REDUCED SHIPPING COST. ALL DIMENSIONS ARE TYPICAL. TOLERANCE +/- .500" John Boos & Co. is constantly engaged in a program of improving products and therefore reserves the right to change specifications without prior notice.





3601 S. Banker St. • Effingham, IL 62401 • PO BOX 609 • quotes@johnboos.com

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 61 - MOP SINK (1 EA REQ'D)

IMC Teddy DL-2

Utensil/Can Washer, 16 gauge #304 stainless steel construction., one-piece wash basin, 1" OD stainless steel tubing wash supports, fully welded, removable scrap drawer, integrated 12" backsplash, double foot pedal valve, returnmounted faucet, w/48" flexible stainless steel hose & spray head

Project_______ Consultant______ Model Number______ Item Number______

DL-2 Utensil/Can Washer and Sanitizer

SPECIFICATION:

DL-2 Model Utensil/Can Washer and Sanitizer is constructed of 16gauge #304 stainless steel and consists of a coved wash basin with 1" OD tubular equipment supports and fully integrated outer shell and has a 12" high backsplash. A perforated scrap drawer collects solid waste for disposal periodically. Faucet, T&S #B-1152, or equal, with flexible 48" long stainless steel hose and brush spray head are mounted on top of backsplash. Double foot pedal valve, T&S #B-0502, or equal, mounted on a stainless steel bracket, controls a heavy-duty nozzle spray head with a 360 degree revolving cleaning pattern. Bottom drains to a 2" brass waste outlet. Entire unit is mounted on adjustable stainless steel legs.

PRODUCT GUIDE:

IMC Utensil/Can Washer and Sanitizers are easily cleanable without the use of tools. All corners are coved, and all seams are fully welded and polished.

Compact design with multiple features is ideal for cleaning and washing all large and medium sized utensils and cans or pots. Faucet is used for pot filling or cleaning. Spray brush head helps loosen solid waste. Built-in nozzle spray head at the bottom provides a powerful cleaning cycle. Scrap tray is emptied and cleaned easily.

OPTIONS:

☐ Seismic, bolt-down legs

□ Correctional Package





*Price Page 70

Specifications subject to change without notice.



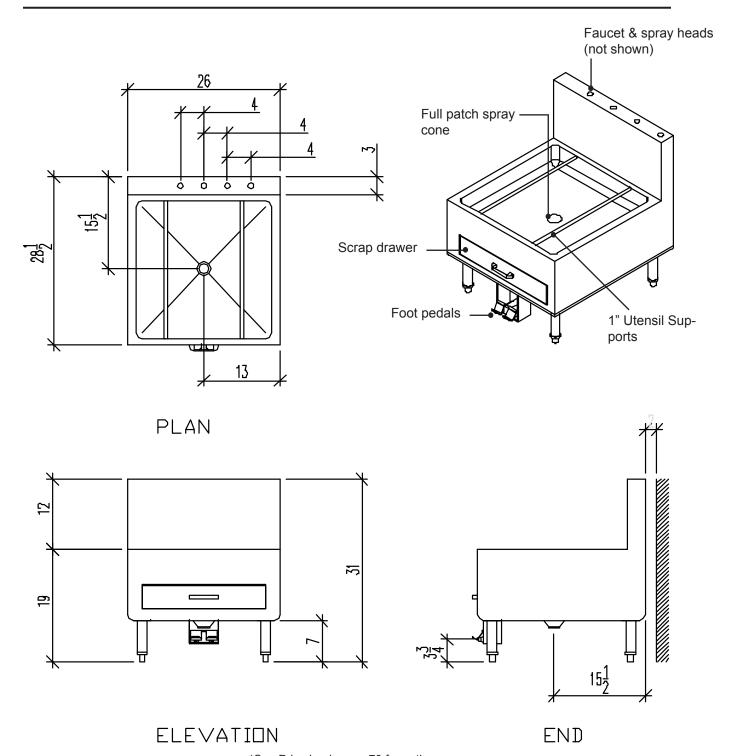
P.O. Box 206 Copiague, NY 11726-0206

www.imcteddy.com

800-221-5644/631-789-8881 Fax: 631-789-3633

DL-2-30 1007

DL-2 Utensil/Can Washer and Sanitizer



*See Price book page 70 for options.

Specifications subject to change without notice.



P.O. Box 206 Copiague, NY 11726-0206 800-221-5644/631-789-8881 Fax: 631-789-3633

DL-2-30 1007

www.imcteddy.com

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 63 - AIR CURTAIN (1 EA REQ'D)

Berner SLC07-1036A

Sanitation Series Low Profile Air Curtain, 36"L, unheated, (1) 1/5 hp motor, for doors up to 7' high, aluminized steel cabinet, baked-on electrostatic white powdered coated aluminum steel cabinet, interior or exterior mounting, UL listed, EPH listed for NSF 37

ACCESSORIES

Mfr	Qty	Model	Spec
Berner	1		Five year parts warranty (unheated units)
Berner	1	Α	120v/60/1-ph, 3.4 amps
Berner	1		White powder coat exterior finish standard



SANITATION CERTIFIED LOW PROFILE 7

Ambient (Unheated) Air Curtain Data Sheet

For Door Heights To 7' (insect control)

STANDARD CONSTRUCTION

- EPH Listed per NSF 37
- 8 1/2" high x 8" deep
- 1/5 hp single speed motor(s)
- White powder coated exterior (Optional: Custom Color or Stainless)
- Wall & Top Mounting



5 Year Limited Warranty











Air Curtain Fans for ANSI/NSF37 Customer Entry maximum mounting height is 7'

MODEL	Nozzle Width (in)	Max Vel. at Nozzle (fpm)	Avg. Outlet Vel. (fpm)	Air Volume (cfm)	Outlet Vel. Uniformity	Power Rating (kW)	Motor(s) @ hp	Net Wt. (lbs)
SLC07-1036A	34.62	3,621	1,786	1,020	92%	0.32	1 @ 1/5	35
SLC07-1042A	40.62	3,439	1,773	1,188	93%	0.32	1 @ 1/5	38
SLC07-1048A	46.62	3,274	1,769	1,360	94%	0.32	1 @ 1/5	42
SLC07-1060A	58.13	2,984	1,727	1,656	95%	0.32	1 @ 1/5	49
SLC07-1072A	71.37	2,913	1,725	2,031	95%	0.32	1 @ 1/5	56
SLC07-2084A	83.50	3,439	1,725	2,376	93%	0.64	2 @ 1/5	76
SLC07-2096A	95.50	3,274	1,727	2,720	94%	0.64	2 @ 1/5	84
SLC07-2108A	107.00	3,274	1,709	3,016	94%	0.64	2 @ 1/5	91
SLC07-2120A	118.50	2,984	1,695	3,312	95%	0.64	2 @ 1/5	98

NOTE: Operation at 50 Hz will generate approximately a 17% reduction in air performance.

See sheet EP-300 for amp draws/total load requirements.

VELOCITY PROFILE: M	odel S	LC07-10	036A
Distance from Nozzle (ft)	2	3	4
Core Velocity (fpm)	1986	1643	1407

MODEL NUMBER CONFIGURATION SLC07-1 036 A A-SS

				$T \rightarrow T$	_
Series	# of Motors	Opening Width	Heat	Voltage	Opt. Cabinet Finish
SLC07	1, 2	036" - 120"	A=Ambient	*A=120/1/60 B=208/1/60 J=240/1/60	SS=Stainless Steel CC=Custom Color
				V=220/1/50	
				*Suitable for 50	hz

Carradilar

Sound level measured 10' (3m) from the unit in free field: 1 & 2 motor(s): 54 dBA & 57 dBA

Berner reserves the right to alter specifications without prior notice.

www.berner.com Berner International Corporation 800.245.4455 111 Progress Ave. / New Castle / PA / 16101 / USA DS-300 January, 2015

Graceland/Holabird

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SANITATION CERTIFIED LOW PROFILE 7

Ambient (Unheated) Air Curtain Electrical Performance Sheet

					208/1/60 (voltage code B) or				_
		120/1/60 (volta	ge code A)		220/1/50 (volta	ge code V)		240/1/60 (volta	ige code J)
		MOTOR AMP DRA	AW = 3.4 each		MOTOR AMP DRA	AW = 1.7 each		MOTOR AMP DRA	AW = 1.7 each
MODEL	# CKTS	AMPS PER CIRCUIT	BREAKER RATING PER CIRCUIT	# CKTS	AMPS PER CIRCUIT	BREAKER RATING PER CIRCUIT	# CKTS	AMPS PER CIRCUIT	BREAKER RATING PER CIRCUIT
SLC07-1036A SLC07-1042A SLC07-1048A SLC07-1060A SLC07-1072A	1	3.4	15	1	1.7	15	1	1.7	15
SLC07-2084A SLC07-2096A SLC07-2108A SLC07-2120A	1	6.8	15	1	3.4	15	1	3.4	15

Berner reserves the right to alter specifications without prior notice.

www.berner.com Berner International Corporation 800.245-4455 111 Progress Ave. / New Castle / PA / 16101 / USA

EP-300 January, 2015

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Graceland/Holabird

MODEL SLCO7 CURTAIN
AMBIENT SYSTEM

BERNER INTERNATIONAL CORP

NEW CASTLE,PA.

28MAR2016

S. Beil

S. Beil

REPLACES 140CT14

DATE

BY

Item #63









SLC07-2108A

SLC07-2120A

107.00 [271.78]

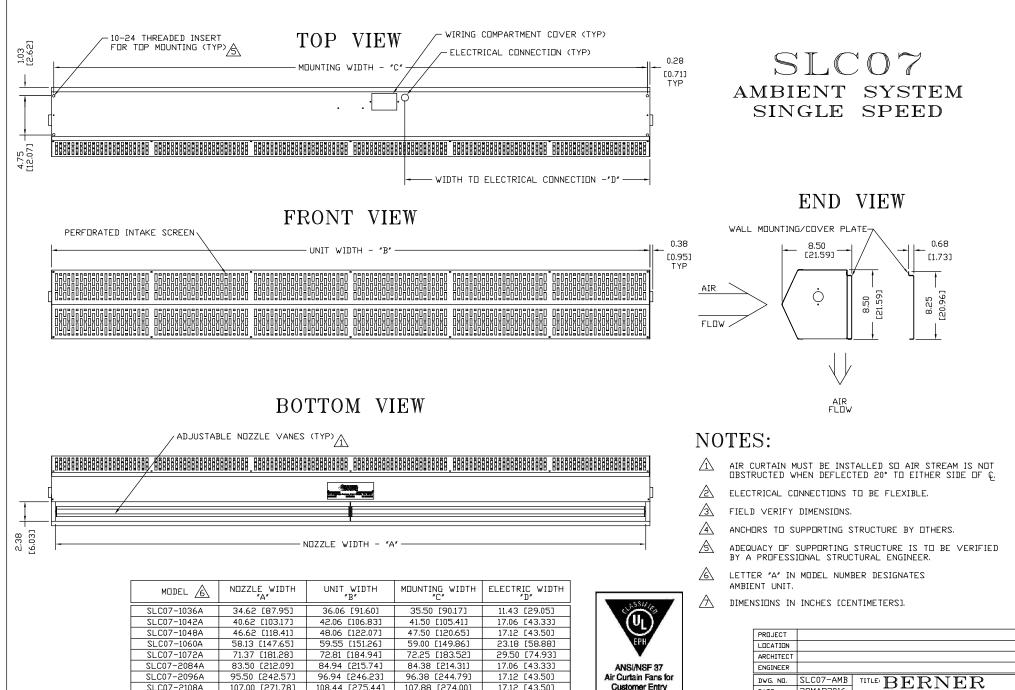
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108.44 [275.44]

119.94 [304.65]

107.88 [274.00]

119.38 [303.21]



17.12 [43.50]

23.18 [58.88]

12CS

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 66 - CELING HUNG POT RACK (1 EA REQ'D)

Aero CPS-60

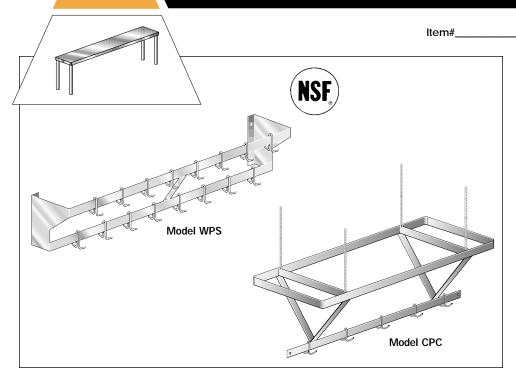
Pot Rack, ceiling mount, 60"W x 24"D x 16"H, triple-bar design, constructed of 3/16" x 2" stainless steel flat bar, includes plated double-pronged pot hooks (one per rung per foot) & (4) 24" chrome-plated chains for mounting, fully welded, NSF



WALL & CEILING POT RACKS

WP/CP/SBPR/CPR SERIES

Project



Quantity	GREYCOAT Model #	STAINLESS STEEL Model #
WP	SERIES	
	WPC-24 WPC-36 WPC-48 WPC-60 WPC-72 WPC-84 WPC-96 WPC-108 WPC-120 WPC-132 WPC-132	WPS-24 WPS-36 WPS-48 WPS-60 WPS-72 WPS-84 WPS-96 WPS-108 WPS-120 WPS-132 WPS-132
CP S	SERIES	
	CPC-36 CPC-48 CPC-60 CPC-72 CPC-84	CPS-36 CPS-48 CPS-60 CPS-72 CPS-84
	CPC-96 CPC-108 CPC-120 CPC-132	CPS-96 CPS-108 CPS-120 CPS-132

CPS-144

SBSPR-36

SBSPR-48

SBSPR-60

SBSPR-72

SBSPR-84

SBSPR-96

CSPR-44

SBSPR-108 SBSPR-120

CPC-144

SBGPR-36

SBGPR-48

SBGPR-60

SBGPR-72

SBGPR-84

SBGPR-96

SBGPR-108

SBGPR-120

CGPR-44

MATERIAL

TOP

- WPC

- WPC 2" x %6" painted flat bar.

 CPC 2" x %6" painted flat bar.

 SBGPR 2" x %6" painted flat bar.

 CGPR 2" x %6" painted flat bar.

 WPS 2" x %6" painted flat bar.

 WPS 2" x %6" 304 stainless steel flat bar.

 CPS 2" x %6" 304 stainless steel flat bar.

 SBSPR 2" x %6" 304 stainless steel flat bar.

 CPSR 2" x %6" 304 stainless steel flat bar.

 Plated we theore (one per rung per foot)
- Plated pot hooks (one per rung per foot).
- Ceiling mount complete with set of 4-24" long plated chains.

DESIGN FEATURES

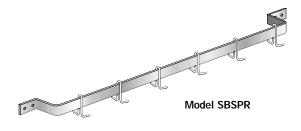
- All potracks fully cartoned.
- Fully welded—ready to use.

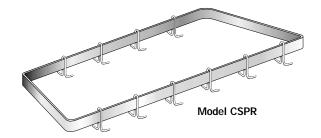
CONSTRUCTION

- Stainless steel racks are polished to a #4 mill finish.
- Heliarc welded construction creates uniform, rock-solid unit.
- Greycoat racks are painted with NSF approved grey enamel.

- Call for custom sizes and configurations.
- For table mounting potracks, see Flexible Workcenter page SP-6A, SP-6B.

AT AERO **WE PROVIDE CUSTOM EQUIPMENT** AT PRODUCTION PRICES!

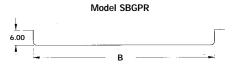


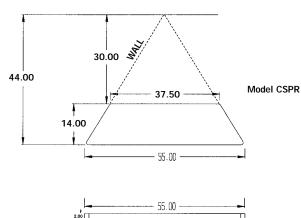


BUILT TO LAST A LIFETIME

email - sales@aeromfg.com AERO MANUFACTURING COMPANY • 310 ALLWOOD ROAD, CLIFTON, NEW JERSEY 07012 • VOICE 973.473.5300 FAX 973.473.3794

DIMENSIONAL SPECIFICATIONS AERO WP/CP/SBPR/CPR SERIES +12.00 -- **---12.00**-12.00 **Model CPC** 24.00 16.00 **STAINLESS** 6.00 В **GREYCOAT** STEEL Ship Cubic Width Length Model # Model # Weight Feet 12.00 Model WPS WPC-24 WPC-36 WPC-48 WPS-24 WPS-36 12 12 24 3 4 36 14 12 WPS-48 48 16 WPC-60 WPC-72 WPC-84 12 60 WPS-60 18 5 6 7 8 9 12 12 12 12 12 72 WPS-72 21 24 26 28 WPS-84 84 WPC-96 WPC-108 WPS-96 96 108 WPS-108 12.00 12 120 WPC-120 WPS-120 31 10 12 WPC-132 WPC-144 WPS-132 WPS-144 34 37 11 12 132 144 8.00 2.00





CP S	SERIE:	S			
24	36	CPC-36	CPS-36	23	6
24	48	CPC-48	CPS-48	26	7
24	60	CPC-60	CPS-60	29	9
24	72	CPC-72	CPS-72	32	11
24	84	CPC-84	CPS-84	36	13
24	96	CPC-96	CPS-96	44	15
24	108	CPC-108	CPS-108	48	17
24	120	CPC-120	CPS-120	51	18
24	132	CPC-132	CPS-132	55	20
24	144	CPC-144	CPS-144	58	22

_	A Width	B Length	GREYCOAT Model #	STAINLESS STEEL Model #	# Hooks	
	SBP	R SER	IES			
	6	36	SBGPR-36	SBSPR-36	6	
	6	48	SBGPR-48	SBSPR-48	9	
	6	60	SBGPR-60	SBSPR-60	9	
	6	72	SBGPR-72	SBSPR-72	9	
	6	84	SBGPR-84	SBSPR-84	9	
	6	96	SBGPR-96	SBSPR-96	9	
	6	108	SBGPR-108	SBSPR-108	9	
	6	120	SBGPR-120	SBSPR-120	9	
	CPR	SERII	ES			
	44	44	CGPR-44	CSPR-44	7	

All dimensions are typical (tol. $\pm \%").$ • For Accessories and Options see pages TS-5A & TS-5B. email - sales@aeromfg.com

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 67 - AIR TREATMENT SYSTEM (1 EA REQ'D)

Franke APS300

(18008700) APS300, Ozone/UV Air Purification System, for Walk-In Coolers, commercial grade, heavy duty, extends shelf life of fresh produce, eliminates chemicals that cause over-ripening in fruits and vegetables, eliminates flavor transfer among foods, minimizes waste, walk-in cooler volume capacity up to 2500 cubic feet, front mounted on/off switch, LED indicator lamp, 3A push-to-reset circuit breaker, audible lamp replacement reminder, front/side standoff bumpers, 304 stainless steel construction, 120v/60/1-ph, 240 watt, 1 amp, 6' power cord with NEMA 5-15P plug, NSF, cULus (UV bulbs require annual replacement)

ACCESSORIES

Mfr	Qty	Model	Spec
Franke	1		12 months parts & labor warranty (product) and
			90 day warranty excluding breakage (UV bulb)

FRANKE FOODSERVICE SOLUTIONS

APS

AIR PURIFICATION SYSTEM



MODEL NUMBER(S)

☐ APS300 Up to 2500 Cubic Feet

PRODUCT OVERVIEW

Franke's ozone-UV Air Purification System continuously sanitizes the air in walk-in coolers. It eliminates chemicals that cause over-ripening of fruits and vegetables, eliminates flavor transfer among foods and minimizes waste, keeping fruits and vegetables fresh.

STANDARD PRODUCT FEATURES

- Commercial grade, 304 stainless steel construction
- Standoff bumpers, front and side
- Front Mounted 3A "push-to-reset" circuit breaker
- Front mounted on/off switch
- Indicator light; shown current functionality of unit and UV bulbs
- Audible reminder to exchange UV bulb
- 6'/ 1.8m (L) electrical cord
- Warranties: 1 year parts, 1 year labor, excludes UV bulbs
- UV bulbs warranty 90 days, excluding breakage

CAPACITY

Model	Walk-In Refrigerator Cubic Feet/Units Required			
A DC 200	1000-2500	2500 -5000	5000-7500	
APS300	1 Unit	2 Units	3 Units	

ACCESSORIES

- ☐ 18010215 Ozone and UV bulbs replacement set for Franke APS300
- ☐ 18009066 Mounting Kit



18010215



18009066





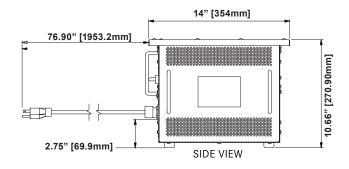
Franke Foodservice Solutions, Inc. 800 Aviation Parkway Smyrna, TN 37167 Tel +1-877-379-3769 frankeamericas.com Approval _____

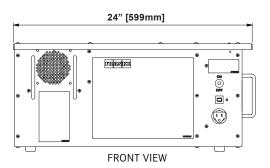


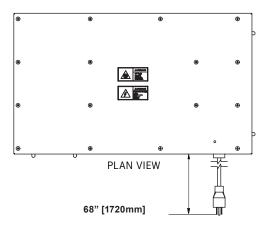


APS300

APS - AIR PURIFICATION SYSTEM







SN	Width	23.60"	599.4mm		
OIMENSIONS	Depth	13.95"	354.3mm		
DIM	Height	10.66"	271.9mm		
-	Voltage		120		
_	Phase	•	1		
SICA	Amps (by phase)		2.0 Max		
ELECTRICA	Watts (by phase)		240 Max		
33	Unswitched Circuit		NEMA 5-15R		
GHT	Unit	-	25lbs		
WEIG	Total Shipping Weight		30 lbs		
9	Number of Cartons/Crates		1		
SHIPPING	FOB		Fayetteville, TN 37334		
SH	Freight Class		Ships via UPS		

SHORT-FORM SPECIFICATIONS: Model No. APS300, measuring 23.60" L by 13.95" W by 10.66" H and requiring 120/60/1 at 2.0A maximum, supplied by 120V/15A NEMA 5-15 receptacle on unswitched outlet. Shall include 304 stainless steel body, front-mounted on/off switch, 6 ft. electrical cord with plug, LED status indicator lamp, 3A push-to-reset circuit breaker, audible lamp replacement reminder, and front and side standoff bumpers. Shall include 90 day warranty on UV bulbs excluding breakage, and 1 year parts and 1 year labor warranty. Provide options and accessories as indicated.

MISCELLANEOUS

Sits on existing shelf. Must be mounted as high as possible



Scan QR code to visit the Franke Resource Center.

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Document #20.110002902 - REV 14Apr 2016





FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 68 - HIGH PRESSURE WASHING SYSTEM (1 EA REQ'D)

Sage Sanitizing 061107R

Sage Sanitizing 061107R Item #68



HIGH PRESSURE SANITIZING SYSTEMS









Construction:

Stainless steel cart, handle, structure, and hardware.

Full locking commercial front casters.

Stainless Float tank with 1" air gap to prevent backflow.

Leeson commercial electric motor with manual reset thermal overload protection.

35 foot (10.7m) power cord with GFCI and plug.

6 foot (1.8m) water inlet hose, with 3/4" garden hose thread.

Cat Triplex plunger pump.

Vacuum formed ABS cover.

All fluid handling components are brass, stainless, or high pressure hose.

Light 5/16" dia Spray hose, bright yellow, non-marking, with flex guards and 1/4" brass Quick Disconnect sockets at each end.

Ergonomic spray gun with stainless wand, heat insulating grip, and adjustable nozzle for low/high pressure and steam/spray.

Features:

Fully certified and listed as a pressure washer for commercial indoor use.

In-line water filter protects machine from debris.

Adjustable Unloader valve allows the unit to idle and recirculate when the spray gun is closed.

Pressure Relief Valve maintains a safe maximum pressure.

Thermal Relief Valve prevents recirculated water from overheating while idling by discharging 100ml of heated water and replacing it with cool water. Discharge occurs at165°F.

AutoChem Feature:

Automatically switch from chemical To rinse at spray gun, by switching The nozzle from low to high pressure.

Note: Chemicals are ONLY applied at low pressure (about 1/10 of machine maximum rated pressure).

Item:							
Project:							
Product: Sage Mobile							
Model: SM-101107R							
	06	0	1	03	N		
	08	1	2	05	R		
	10	2	3	07			
		3		10			

1.Pick a Pressure

06 = 600 psi (41 bar) maximum

08 = 800 psi (55 bar) maximum

10 = 1000 psi (69 bar) maximum

2.Pick a Chemical Injection Method

0 = Soap and Sanitize, Gravity fed (solenoid)

- 1 = Soap and Sanitize, Pump fed (peristaltic)
- 2 = Soap only, Gravity fed (solenoid)
- 3 = Soap only, Pump fed (peristaltic)

3.Pick a Power Supply

- 1 = 115 Volt, 60 Hertz
- 2 = 230 Volt, 50 Hertz
- 3 = 230 Volt, 60 Hertz

4. Pick a Hose Length

- 03 = 30 feet (9.1 meters)
- 05 = 50 feet (15.2 meters)
- 07 = 75 feet (22.9 meters)
- 10 = 100 feet (30.5 meters)

5. Optional Suffixes

N = No other options

R = Stainless Manual Hose Reel (up to 75' of hose)

Options: Solenoid Valve

Opens on demand to allow siphon action of pump to pull chemical into system with gravity's help at adjustable mix ratio.

Peristaltic Pump

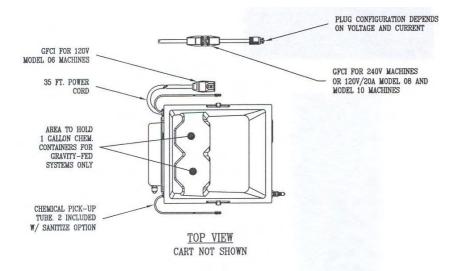
Pulls chemicals against gravity or over longer distances. Meters chemicals to specific, adjustable mix ratios. (230 Volt machines use a diaphragm pump with similar features).

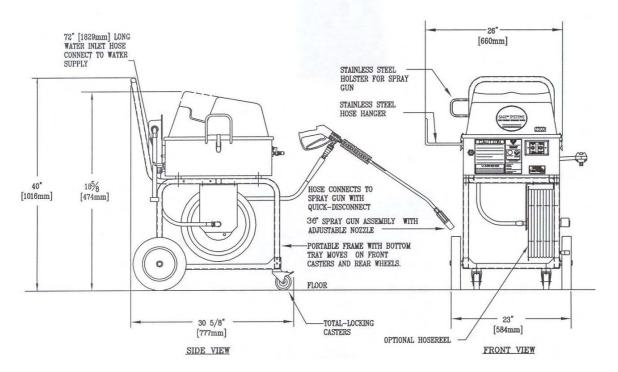
Manual Hose Reel

Stainless Steel reel for installation at machine or remote station Holds up to 75 feet of hose. Keeps work site neat and organized.

Specifications

06 Models	08 Models	10 Models
600 PSI (41 bar)	800 PSI (55 bar)	1000 PSI (69 bar)
2.9 gpm (11.0 lpm)	2.9 gpm (11.0 lpm)	2.9 gpm (11.0 lpm)
1.5 HP motor	2.0 HP motor	2.0 HP motor
12 AMPS @ 115 Volts	15 AMPS @ 115 Volts	18 AMPS @ 115 Volts





Master Distributors

USA & Canada

Market Equipment & Repair 7300 Quimby St. Paramount, CA 90733. USA Tel: +1 562 529 5494 Fax: +1 562 529 5310 Email: nick@marketequipmentrepair.com Web: www.marketequipmentrepair.com

United Kingdom

Sage Sanitizing Systems
Unit 4, Cheney Manor Industrial Estate
Swindon, Wittshire, England SN2 2UD
Tel: + (0)1793 603487 Fax: + 44 (0)1793 603489
Email: sagesales@sagesanitizingsystems.com
Web: www.sagesanitizingsystems.com

Sage Systems

HIGH PRESSURE SANITIZING SYSTEMS

Worldwide Manufacturing Facility

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Tel: + (0)1793 603487 Fax: + 44 (0)1793 603489
Email: sagesales@sagesanitizingsystems.com
Web: www.sagesanitizingsystems.com

Master Distributors

Middle East

D & S Exports Inc 24 Broad Street, Norwalk, CT 06851. USA Tel: +1 203 847 6446 Fax: + 1 203 849 9526 Email: s.straut@dsusa.net Web: www.dsusa.net

South Asia and Pacific Rim

D & S Exports Pure Support SDN BHD 29-6 Block F2, Jalan PJU 1/42A, Dataran Prima, 47301 Petaling Jaya, Selangor Darul Ehsan, MALAYSIA Tel: 603 7880 5758 Fax: 603 7880 5760 Email: puresup@dsusa.net Web: www.dsusa.net

FOODSERVICE CUT SHEETS

02/02/2017

Project: To: From:

Graceland/Holabird

ITEM# 69 - STRIP CURTAIN UNIT (1 EA REQ'D)

Berner ESA040084

Strip Door, 40"W x 84"H, Easzy Strip series, loop & bar hardware, clear PVC strips, tear & abrasion resistant (price based on type specified)

ACCESSORIES

Mfr	Qty	Model	Spec
Berner	1		One year replacement for mfg. defects on vinyl products
Berner	1	ESA040084-06060STB	Standard grade, 6"W x .060 thick strips, 67% of overlap

SECTION 11 51 23 - LIBRARY STACK SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Modular wood library shelving system.

1.2 SUBMITTALS

- A. Product Data: For each type of library shelving system and accessory specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes
- B. Shop Drawings: Show plans, elevations, ends, cross-sections, and installation and anchorage details.
- C. Samples: Of each exposed product and for each color and finish required, 6 inches square.

1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide shelving and accessories manufactured by the same manufacturer.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify library shelving system placement by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating shelving system without field measurements. Coordinate work of other contracts to ensure actual installation dimensions correspond to established dimensions.
- B. Space Enclosure and Environmental Limitations: Do not install library shelving until spaces are enclosed and weatherproof, wet-work in spaces is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are being maintained at the levels indicated for Project when occupied for its intended use.

1.5 COORDINATION

A. Coordinate layout and installation of shelving with work of other contracts.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Drawings indicate the catalog numbers of library shelving units by manufacturer indicated, which are representative products used to establish a standard of design and quality required. Subject to compliance with requirements, provide Pin-Fast Wood & Steel Shelving; by The Worden Company, or a comparable product by one of the following:
 - 1. Brodart Co.
 - 2. Library Bureau.
 - 3. Russwood Library Furniture.

2.2 WOOD LIBRARY SHELVING

- A. Wood Shelving: Modular type, with starter and adder units, 36 inches on center of uprights, complying with the following:
 - 1. End Panels: 1-inch thick, 5-ply lumber core, exposed vertical edges banded with matching solid hardwood with square eased edges. Provide vertical rows of holes drilled near the front and rear of each panel for shelf adjustment on 1-inch centers. Attach tops and bases to end panels with 5/16-inch 18 x 3-inch hex-head bolts and washers. Do not use lag bolts or wood screws.
 - 2. Intermediate Uprights: 3/4-inch thick, solid maple hardwood glued up in flush panel design with square edges. Provide random width boards, no more than 4 inches or less than 1-inch. Stagger pin holes on both sides of panel to avoid coinciding with holes on opposite side. Drill panels through front and rear, top and bottom, for attachment of tops and bases with 5/16-inch 18 x 3-inch hex-head bolts, nuts and washers.
 - 3. Cornice Tops: 2-1/4-inch fascia, 3/4 inches thick of solid maple banded to 3/4-inch plywood panel. Provide 1/8-inch radius to top front corner of fascia. Butt a solid hardwood bolting cleat 2-1/4 by 1-1/4 inches glued and stapled to inside surface of top at each end.
 - 4. Base: ½-inch solid maple, 4 inches high. Provide a 2 by 3/4 inch rail tenoned full-length to the inside front. Provide bolting cleats 2-1/4 by 1-1/4 inches glued and stapled at ends of rail and drilled to allow assembly bolts to pass through. Provide second full-length rail at rear of bolting cleats for support and proper alignment.
 - 5. Shelves: 3/4-inch thick, solid hardwood wit 2-inch nosing of solid maple. Provide random widths no more than 4 inches or less than 1-inch. Groove shelves 11/32 inches in diameter half round on underside of shelves to set firmly on 1-inch long, 5/16-inch diameter cadmium-plated and threaded shelf pins.
 - 6. Backs and Partitions: 1/4-inch plywood to match shelving. Provide backs finished on one side for single-faced shelving. Provide partitions finished on both sides for double-faced shelving.
- B. Wood Species and Cut for Exposed Surfaces: Clear maple, plain sliced...

2.3 ACCESSORIES

- A. Shelf Label Holders: Plastic, for card size 5/8 by 5 inches.
- B. Special Shelves: Provide special shelving units for the following as required:
 - 1. Videos.
 - 2. Periodicals.
- C. Provide shelving units on heavy duty wheels with locks.

2.4 FINISHES, GENERAL

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 WOOD FINISHES

A. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards," Section 1500 requirements for factory finishing.

B. Shop Finishing: Finish wood components at the fabrication shop. Defer final touchup, cleaning, and polishing until after installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for conditions affecting performance of library shelving system.
- B. Examine areas for suitable conditions where library shelving is to be anchored.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install library shelving system level, plumb, square, and true with integral adjustable leveling devices. Using shims shall not be permitted. Install to a tolerance of 1/8 inch in 96 inches for level and plumb shelves.
- B. Anchor single-faced ranges to wall construction by method recommended by manufacturer.

END OF SECTION

SECTION 11 52 13 - PROJECTION SCREENS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Front projection screen assemblies.
- B. Rear projection screen assemblies.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 Rough Carpentry: Wood blocking in walls and ceilings.
- B. Division 26 Sections for electrical service and connections including metal device boxes for switches and conduit, where required, for low-voltage wiring.

1.3 DEFINITIONS

A. Gain of Front-Projection Screens: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog cuts and descriptive information on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Show layouts and types of projection screens. Include the following:
 - 1. Location of screen centerline relative to ends of screen case.
 - 2. Location of wiring connections.
 - 3. Location of seams in viewing surfaces.
 - 4. Drop length.
 - 5. Connections to supporting structure for pendant- and recess-mounted screens.
 - 6. Anchorage details.
 - 7. Details of juncture of exposed surfaces with adjacent finishes.
 - 8. Accessories.
 - 9. Wiring Diagrams: For electrically operated units.
- D. Samples: For case and frame finishes, submit two samples 2 x 2 inch in size, illustrating color and texture of finish.
- E. Operation and Maintenance Data: Provide manufacturer's operation and maintenance instructions.

1.5 OUALITY ASSURANCE

- A. Source Limitations: Obtain each type of projection screen through one source from a single manufacturer. Obtain each screen as a complete unit, including necessary mounting hardware and accessories.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver projection screens to project site in manufacturer's original unopened packaging. Inspect for damage and size before accepting delivery.
- B. Do not deliver projection screens until building is enclosed and other construction within spaces where screens will be installed is substantially complete and ready for screen installation.

1.7 COORDINATION

A. Coordinate layout and installation of projection screens with adjacent construction, including ceiling framing, light fixtures, HVAC equipment, and partitions.

PART 2 PRODUCTS

2.1 REAR PROJECTION SCREENS

- A. Manufacturers:
 - 1. Bretford: www.bretford.com.
 - 2. Da-Lite Screen Company: www.da-lite.com.
 - 3. Draper, Inc: www.draperinc.com.
- B. Rear Projection Screens: Factory assembled unless otherwise indicated.
 - 1. In Spaces Noted: Motorized, transluscent matte light diffusing fabric screen for rear projection, suspended with automatic ceiling closure.
 - a. Acceptable Product: Da-Lite Model Boardroom Electrol; Draper Model Envoy; or equal product by other listed manufacturer.
- C. Matte Light Diffusing Rear Projection Fabric: Transluscent Light diffusing screen fabric; washable, flame retardant and mildew resistant.
 - 1. Material: Matte white vinyl on fiberglass backing, with nominal gain of 1.0 over viewing angle not less than 70 degrees from axis, horizontally and vertically.
 - 2. Mildew Resistance: Rating of 0 or 1 when tested according to ASTM G21.
 - 3 Flame Resistance: Passes NFPA 701
 - 4. Seamless Construction: Provide screens, in sizes indicated, without seams.
 - 5. Drop Length: Provide extra drop length at top of screen to permit viewing surface to be clear of obstructions.
 - 6. Edge Treatment: Black masking borders.
- D. Electrically-Operated Screens:
 - 1. Roller: 3 inchaluminum, with locking device.
 - 2. Vertical Tensioning: Screen fabric weighted at bottom with steel bar with plastic end caps.
 - 3. Horizontal Tensioning: Tab-guided cable system.
 - 4. Motor size and capacity as recommended by screen manufacturer.
 - 5. Permenantly lubricated ball bearings.
 - 6. Preset limit switches to automatically stop screen in up and down positions.
- E. Provide mounting hardware, brackets, supports, controls, fasteners, and other mounting accessories required for a complete installation, in accordance with manufacturer's recommendations for specified substrates and mountings.

2.2 ELECTRICAL COMPONENTS

- A. Electrical Components: Listed and classified by UL as suitable for the purpose specified and indicated.
- B. Motors: Direct drive, 110 V, 60 Hz.
 - 1. Motor In Roller: Mounted inside roller; pre-wired; quick reverse type; equipped with thermal overload cut-off.
 - a. Motor mounted on vibration dampener.
 - 2. End Mounted Motor: Mounted at end of roller; pre-wired; quick reverse type; equipped with thermal overload cut-off.
 - a. Motor mounted on sound absorber.
- C. Controls: 3 position control switch with plate matching other electrical device cover plates in room where switch is installed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate is finished and ready to accept screen installation.
- B. Verify type and location of electrical connections.
- C. Do not install projection screens until climate control systems are in place and interior painting and other finishes are completed.

3.2 PREPARATION

- A. Coordinate screen installation with installation of projection systems.
- B. Coordinate installation with adjacent construction and fixtures, including ceilings, walls, lighting, fire suppression, and registers and grilles.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, using manufacturer's recommended hardware for relevant substrates.
- B. Do not field cut screens.
- C. Install screens in mountings as specified and as indicated on drawings.
- D. Install plumb and level when screen is lowered.
- E. Install electrically operated screens ready for connection to power and control systems by others.
 - 1. Install low-voltage controls according to NFPA 70 and manufacturer's written instructions.
 - a. Intall wiring in raceway except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use UL-listed plenum cable in environmental air spaces, including plenum ceioings. Conceal raceway and cables except in unfinished spaces.
- F. Adjust projection screens and related hardware in accordance with manufacturer's instructions for proper placement and operation.
- G. Test electrical screens for proper working condition. Verify that screen controls, limit switches, closure, and otaher operating components are in optimum functioning condition. Adjust as needed.

3.4 PROTECTION

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

END OF SECTION

SECTION 11 61 42 - PLATFORM CURTAINS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes curtains, track, carriers, pipe grid and accessories.
- B. Section includes the following types of Stage curtains.
 - 1. Front curtain.
 - 2. Teaser.
 - 3. Cyclorama.

1.2 DESIGN REQUIREMENTS

- A. Mill seconds and imperfect runs of mill seconds will be rejected.
- B. Fire Performance Characteristics:
 - 1. Supply fabric manufacturer's flameproof certificates at the time of invoice for all fabrics specified and selected; fabrics must be flameproof in accordance with requirements of state and local bureaus having jurisdiction.
 - 2. If fabrics are not inherently flame retardant then an applied flame spread treatment must be added; the drapery fabricator is responsible for this procedure at no additional cost to the Owner.
 - 3. Provide curtains that are certified to be flame resistant according to requirements of NFPA 701; permanently attach label to each curtain indicating whether curtain is permanently and inherently flame resistant or whether it will require re-treatment after dry cleaning.
- C. Support Platform curtain items that are to be installed in a fixed position from a system of parallel pipe battens, and a single pipe batten shall correspond to each item, whether the item is a drapery that is tied directly to its corresponding pipe batten, or whether the item is a track that is located between the pipe batten and the drapery, or whether the item supported is some other piece of equipment; fasten hardware to the pipe battens by means of pipe clamps or trim chains.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate end track location, width of opening, location of blocking for anchors, appurtenances and interferences, adjacent construction, operating hardware, and support bracket details.
- B. Product Data: Submit track profiles, shapes, acceptable load data and finishes.
- C. Samples:
 - 1. Submit samples for initial selection purposes in form of fabric manufacturer's standard color card
 - 2. Curtain and Lining Material: Minimum 36 x 36 inches of each color or pattern selected.
 - 3. Drapery Track: Minimum 18 inches long.
 - 4. Bottom and side hem intersection (include weights).
- D. Maintenance Data: Dry-cleaning or laundering instructions; include precautions in use of cleaning materials which may be detrimental to the surface if improperly applied.
- E. Surface Burning Characteristics: NFPA 701 small-scale vertical burn test.
- F. Certificates:

- 1. Submit certification from a corporate officer of the manufacturer with the sample submissions.
- 2. The certificate is required to include data and test ratings for physical properties specified.
- 3. Architect reserves the right to perform similar tests.

1.4 OUALITY ASSURANCE

A. Fabricator/Installer Qualifications: Firm experienced in producing Platform curtains similar to those indicated for this Project that have a record of successful in-service performance with minimum five years experience.

1.5 PROJECT CONDITIONS

- A. Review the Drawings and Project Manual and visit the site before manufacturing, in order to field check conditions and to take accurate measurements; show recorded measurements on final shop drawings.
- B. Verify field measurements are as indicated on shop drawings.
- C. Supply and properly install equipment and miscellaneous items necessary for a proper installation of the Platform curtains at no additional charge.

PART 2 PRODUCTS

2.1 AVAILABLE MANUFACTURERS

- A Track:
 - 1. Automatic Devices Company.
 - 2. J. R. Clancy, Inc.
 - 3. The Janson Industries.

B. Fabric:

- 1. Dazian, Inc.
- 2. K-M Fabrics, Inc.
- 3. Melfabco, Inc.
- 4. The Janson Industries.

2.2 MATERIALS

- A. Woven Cotton Velour:
 - 1. Napped fabric of 100 percent cotton.
 - 2. 54-inch minimum width.
 - 3. Not less than 40 backing ends per inch, 40 pile ends per inch and 32 picks per inch; 640 pile tufts per square inch.
 - 4. Fabric weighing not less than 23 ounces per linear yard before flameproofing, with one pile height of approximately 125 mils.
- B. Lining: Yarn-died denim cloth of 100 percent cotton, woven in a warp-faced twill; 54 inch minimum width.
- C. Repp Cloth:
 - 1. Rough-textured woven fabric with a finished appearance on both sides of cotton yarn.
 - 2. Flame resistant.
 - 3. 54-inch minimum width.
 - 4. Fabric weighing not less than 14 ounces per linear yard.

- D. Steel Pipe: ASTM A53, Grade A, black, standard weight (Schedule 40), 1-1/2 inch nominal diameter, unless otherwise indicated.
- E. Supports, Clamps and Anchors: Sheet steel in manufacturer's standard gages; galvanized after fabrication.
- F. Support Chains: Weldless, double-loop steel pattern chain, not less than No. 6/0; 0.192 inch thickness.
- G. Inserts, Bolts and Fasteners: Manufacturer's standard units.

2.3 FABRICATION - CURTAINS

A. Curtain Fabric:

- 1. Do not incorporate pierced horizontal or split width of materials in any part of the curtains.
- 2. Provide all fabrics of one color from one and the same dye lot; odd-and-end usage of color is not permitted.
- 3. Fabricate velour curtains with the nap down.

B. Lining:

- 1. Do not permit lining to hang loose from face material; attach to top of bottom hem of face material by tape 3/4 inch wide by 4 inches long.
- 2. Tape sections are to be located at each vertical seam across entire width of curtain sections.
- 3. Include integral shrinkage tuck of proper acceptable proportion.
- 4. Do not permit lining to prevent curtains from assuming soft and even folds and be in same fullness as face material.
- 5. Lining to be 2 inches shorter than face material.

C. Top Finish:

- 1. Fabrication to the specified dimensions with the specified fullness pleated to a 3-1/2 inch jute webbing.
- 2. Double-stitch jute webbing to the top of the curtain with 1 inch of face fabric turned back under the webbing.
- 3. Insert heavy-duty grommets at each pleat with a tie line for fastening to battens.
- 4. Items so specified lined in same fullness as face material.
- 5. Supply track-mounted curtains with plated wire S-hooks.
- 6. Supply batten-mounted curtains with 36 inch braided #4 tie lines.

7. Pleats:

- a. Provide fullness in curtains by sewing additional material into 6-inch double-stitched box pleats spaced at 10 inches to 12 inches on center along top hem reinforcing.
- b. Provide not less than No. 2 brass grommets, centered on box pleats, for tie lines or S hooks.
- e. Arrange vertical seams so they do not fall on faces of pleats.
- 8. Pleated-Fullness: Approximately 50 percent; curtain shall have 3 foot overlap.
- D. Vertical Hems: Provide vertical hems not less than 2 inches wide, double-stitched and machine-sewn, with no selvage material visible from front of curtain; sew open ends of hems closed.
- E. Turn Backs: Provide turn backs formed by folding 24 inches of face fabric back at each end of panels and securing by sewing across top hem and grommeting through both layers of fabric; do not sew turn back vertically.

- F. Front Curtain Assembly:
 - 1. The front curtain shall be 23 ounce cotton velour with a denim lining.
 - 2. Weight curtain at bottom with 1/2 ounce lead weights in a segmented supported vinyl weight pocket sewed inside bottom hem (9 weights per foot).
- G. Teaser: Manufactured from same type material as main curtain; attach teaser to rear of Proscenium.
- H. Cyclorama: Standard 16 ounce black repp cloth.
- I. Colors: To be selected by Architect.

2.4 TRACK COMPONENTS

- A. Provide curtain tracks with the total number of carriers, head carriers, stop and all other items necessary to support the full weight of drapery material, and provide smooth operation and uniform appearance of curtains.
- B. Main Curtain:
 - 1. Project Standard: ADC 280 by Automatic Devices Company.
 - 2. Equip with standard end pulleys and continuous 3/8 inch diameter reinforced center, operating line with ball bearing carriers, and floor tension pulleys.
 - 3. Equip for bi-parting operation with center laps not less than 3 feet.
 - 4. Permanently surface-mounted floor pulleys.
- C. Cyclorama Curtain Track:
 - 1. Project Standard: ADC 142R with walk draw operation by Automatic Devices Company.
 - 2. Track may be curved at job site.
- D. Provide track products for front and back curtains with a 1-1/2 inch pipe backbone for additional support.
- E. Battens:
 - 1. Fabricate battens from black iron pipe (1-1/2 inch, Schedule 40) with minimum number of joints.
 - 2. As necessary for required lengths, connect pipe by means of drive fit pipe sleeve not less than 18 inches long and secure with four flush rivets, plug welds or other equally secure method.
 - 3. Shop-paint completed pipe battens with good quality primer.

2.5 PIPE GRID

- A. Provide pipe grid at ceiling of Platform.
- B. Pipe grid consists of a set of pipe battens installed (in plan) perpendicular to the joists.
- C. Individual pipe battens in each set to be located on 6-foot centers.
- D. Rest end of pipe battens on a shelf angle (3 inches x 2 inches) on sides of studio that have masonry wall and secure in place by means of "U" bolts at ends of all pipes.
- E. Rigidly support pipe grid by means of 1/2 inch threaded rods located on centers that shall not exceed 8 feet.
- F. Assemble entire grid into a unit structure.
- G. Pipe battens that compose the grid consists of 1-1/2 inch, Schedule 40, black pipe with battens spanning from wall to wall.
- H. Connect hangers to the overhead structure; hangers provided at each joist where joist crosses the line of the pipe batten.

PART 3 EXECUTION

3.1 PREPARATION

A. Furnish layouts for inserts, clips or other supports required to be installed by other trades to support tracks and battens.

3.2 INSTALLATION

- A. Install materials according to manufacturer's printed instructions and recommendations.
- B. The Contractor is fully responsible for referring Platform equipment loads in this Section to the roof steel.
- C. Supply and install auxiliary angles for pipe as required between roof steel joists or beams.
- D. Where roof steel is exposed, track may be installed directly to the steel by means of clip angles to assure a level installation.
- E. Execute work using high standard of workmanship in fabrication and erection; the finished installation must be complete and functional in every respect with drapery trimmed, leveled and left ready for use.

3.3 INSTALLATION - BATTEN

- A. Install battens by suspending at proper heights with steel chains spaced at not more than 10 feet on center.
- B. Secure chains either directly to structures or to inserts, eye-screws or other devices that are secure and appropriate to substrate and that will not deteriorate or fail with age or elevated temperatures.

3.4 INSTALLATION - TRACK

- A. Stem-mounted Tracks: Drill track at intervals not greater than manufacturer's recommended spacing, and fasten directly to structural ceiling.
- B. Batten-hung Tracks: Install track by suspending from pipe batten with manufacturer's special pipe clamps at recommended spacing.
 - 1. Heavy-duty Track: Do not exceed 6 feet between supports.
 - 2. Curved Walk-along Track: Do not exceed 4 feet between supports, and provide additional supports at curves and splices.
- C. Install track for center-parting curtains with not less than a 3 foot overlap of track sections at center, supported by special lap clamps.

3.5 INSTALLATION - CURTAINS

- A. Furnish curtain sections for full length of all tracks and pipe battens unless noted otherwise.
- B. Install draperies after the floor has been finished and the building has been cleaned.
- C. Track-hung: Secure curtains to track carriers with track manufacturer's special heavy-duty S hooks or snap hooks.
- D. Batten-hung: Secure curtains to pipe battens with minimum 5/8 inch wide by 36 inch long braided soft cotton tie lines.

3.6 ADJUSTING

A. Adjust hardware for smooth operation.

B. Remove temporary bracing, scaffolding, etc., to permit full operation of and access to equipment.

3.7 DEMONSTRATION

- A. Completion Testing:
 - 1. Upon completing the Work of this Section, notify the Architect to schedule an inspection.
 - 2. Furnish sufficient workers to operate equipment and to perform such adjustments and tests as may be required.
- B. Instruct Owner-designated personnel on maintenance and operation of the systems.
- C. Special Testing: If laws, ordinances, or any public authority require the Work to be specially tested or approved, give the Architect timely notice of its readiness for inspection, and of dates of inspection to be made by other authorities.

END OF SECTION

SECTION 11 66 23 - GYMNASIUM EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following gymnasium equipment:
 - 1. Basketball equipment.
 - 2. Physical Education equipment.
 - 3. Safety pads.
 - 4. Floor sleeves for pipe standards.
- B. Related Sections include the following:
 - 1. Division 11 Section "Gymnasium Dividers."
 - 2. Division 26 Electrical.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, attachments to other work, and the following:
- C. Structural analysis data signed and sealed by the qualified professional engineer registered in the State of Maryland responsible for their preparation including loads, point reactions, and locations for attachment of gymnasium equipment to structure.
- D. Samples for Initial Selection: For each type of gymnasium equipment indicated.
- E. Samples for Verification: For the following products:
 - 1. Pad Fabric: Not less than 3 inches square, with specified treatments applied. Mark face of material.
- F. Qualification Data: For Installer and professional engineer.
- G. Operation and Maintenance Data: For gymnasium equipment to include in emergency, operation, and maintenance manuals.
- H. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of gymnasium equipment through one source from a single manufacturer.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install gymnasium 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.

1.5 COORDINATION

A. Coordinate layout and installation of overhead-supported gymnasium equipment and suspension system components with other construction including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which 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.
 - 2. Warranty Period: Five years (unless otherwise specified) from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Performance Sports Systems.
- B. Porter Equipment Company.
- C. Draper.

2.2 MATERIALS

- A. Equipment Wall-Mounting Board: Wood, neutral-color painted finish, size, and quantity as required to mount gymnasium equipment according to manufacturer's written instructions.
- B. Anchors, Fasteners, Fittings and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed; tamperproof, vandal- and theft-resistant design.

2.3 PHYSICAL EDUCATION EQUIPMENT

- A. Adjustable Chinning Bar:
 - 1. Basis-of-Design: Model No. 00197-100 by Porter, or equal by other named manufacturers.
 - 2. Bar shall be designed to provide eighteen (18) inches of adjustment in six (6) inch increments. Unit shall consist of a bar weldment and two (2) heavy, formed channels with wall mounting plates on both ends.
 - 3. The bar weldment shall consist of a 1" diameter solid bar 3'-6" in length, with formed braces to support the bar 1'-5" from the wall. The ends of the formed braces shall be designed to lock into holes on the wall mounted support channels to provide the adjustment capability. The lower ends of the formed brace supports shall be fitted with spring-loaded latch mechanisms to secure unit in place and provide quick and easy height adjustments. Bar may also be completely removed from the wall for storage when required. Hardware shall be provided to attach vertical channel assemblies to the wall.
 - 4. Finish of entire unit to be pit and peel resistant durable, gloss black powder coat.

B. Volleyball Stands:

- 1. Basis-of-Design: Model No. 01991-000 by Porter, or equal by other named manufacturers.
- 2. Posts shall be telescoping type with infinite height adjustment settings to meet all USAV, NCAA and NFHS requirements for competition. Posts shall be furnished with height marking labels for BOYS'/MEN'S height setting of 7' 11-5/8" (2.43m), GIRLS'/WOMEN'S height setting of 7' 4-1/8" (2.24m), and 12 YEAR AND UNDER height setting of 7'-0" (2.13m). Posts that do not telescope (that extend above the top of the net) will not be approved as equal.

- 3. Bottom upright shall be extruded of 6063T6 high strength, lightweight aluminum alloy with a special internal reinforcing rib pattern. (Non-telescoping or steel uprights will not be approved as equal.) Upright shall be 3-1/2" (8.9cm) O.D. to fit standard floor sleeves for new construction or existing floors. Bottom of upright shall be provided with a special molded, composite foot to protect finished floors when moving standards.
- 4. Upper telescoping (adjustable) upright shall be extruded from the same aluminum alloy as the bottom upright with a special rectangular configuration to eliminate rotation. Upper end of telescoping upright shall be equipped with an integral 3" (7.62cm) diameter pulley to reduce cable drag and undue tension on entire system.
- 5. Upper telescoping upright shall be infinitely adjustable in height by means of a special pressure locking T-handle mechanism located on the bottom upright approximately 5'-4" (1.63m) above floor level. Telescoping upright shall be counterbalanced in a static position when adjustment lock is disengaged by means of a special, constant tension spring mechanism located inside the lower upright assembly to eliminate the possibility of accidentally falling while making height adjustments. Bottom end of telescoping upright shall be equipped with special, internally mounted nylon rollers to minimize friction and wear of constant tension spring mechanism.
- 6. Bottom upright and telescoping upright shall be finished in a durable clear anodized finish.
- 7. Tensioning winch (Powr-Winch) shall incorporate a heavy duty, self-locking ratchet mechanism with a compression, disc-brake type release mechanism to eliminate a sudden release of the cable tension when removing net. Powr-Winch brake mechanism shall be self-adjusting to compensate for wear. Ratchet and disc brake lock mechanism shall be completely enclosed by means of a cover. Powr-Winch shall be furnished with a heavy, 1-3/4" (4.45cm) wide, high tensile nylon strap, and forged snap hook mechanism. Nylon strap eliminates the need for the net cable to wrap on the winch drum, which could cause kinking. Powr-Winch furnished complete with removable handle to prevent unauthorized usage. Winch to be located on outside of upright for added player safety.
- 8. Standards shall consist of one reel post and one end post.
- 9. Weight of each post shall not exceed 41 pounds for the reel post and 37 pounds for the end post.
- 10. Nets shall be Porter Model No. 02295-446.
- C. Volleyball Post Wall Storage Rack: Basis-of-Design: Porter Model 825 or equal by other named manufacturer.
- D. Badminton Stands:
 - 1. Basis-of-Design: Model No. 00764-100 by Porter, or equal by other named manufacturers.
 - 2. Standards designed to meet the International Badminton Federation specifications for competition badminton.
 - 3. Uprights to be of heavy-wall 2-3/8" O.D. steel tubing finished in a durable powder-coated finish.
 - 4. Uprights fitted with special top caps with machined grooves for rope in top hem of net to meet competition requirements.
 - 5. Provide manufacturers standard Competition Badminton net for each court.

2.4 BASKETBALL EQUIPMENT

A. Ceiling Suspended Forward Fold Backstops:

- 1. Basis-of-Design: Model No. 3107 "Single Post" ceiling suspended, forward fold, front braced backstop as manufactured by Performance Sports Systems, Noblesville, Indiana.
- 2. "Single Post" vertical main mast assembly shall be constructed of 6-5/8" O.D. (.120" wall ASTM A-500 Grade B) structural steel tubing with diagonal side sway braces of 2 ½"X 1½" X14 gauge ASTM A-513 rectangular steel tube sway braces miter cut and welded in place to a top horizontal 4" x 1½" x 0.18" web ASTM A-36 steel channel. Sway braces shall attach to mast above backboard for maximum rigidity. Mast and sway braces shall be welded for ceiling heights up to thirty (30) feet. Mast and sway braces shall be clamped for ceiling heights over thirty (30) feet (Model 3106). Backstop shall be front braced and fold forward. Front brace assembly shall have a fully adjustable folding knee joint allowing for exact playing position and maintenance free operation.
- 3. Goal shall be mounted directly through backboard into a heavy structural steel weldment which shall be clamped to vertical 6-5/8" O.D. center mast. (This direct attachment feature transfers the load on the goal directly to the mast pipe minimizing stress to glass backboard). Goal and backboard mounting design shall conform to NCAA, NFSHSA and FIBA regulations.
- 4. The all-welded "Single Post" design shall be suspended from custom adjustable hangers with bronze bushings designed to be offset no less than 4" behind the center line of gravity of mast, providing for proper weighting of the assembly and insuring that unit locks securely and automatically into playing position.
- 5. Backstop shall be supported from 3-1/2" O.D. pipe anchored to roof framing members by means of heavy formed steel support fittings. Superstructure pipes to be reinforced with special bridging or bracing when truss centers exceed spans of fourteen (14) feet. Each attachment clamp must be capable of supporting static loads of at least 10,000 lbs. with no deflection.
- 6. All metal parts shall have factory applied powder coat finish in color selected by Architect from manufacturers full range.
- 7. Folding Method: Electric Winch.

B. Ceiling Suspended Side Fold Backstops:

- 1. Basis-of-Design: Model No. 3109 "Single Post" ceiling suspended, side fold, side braced backstop as manufactured by Performance Sports Systems, Noblesville, Indiana.
- 2. "Single Post" vertical main mast assembly shall be constructed of 6-5/8" O.D. (.120" wall ASTM A-500 Grade B) structural steel tubing with diagonal side sway braces of 2 ½"X 1½" X14 gauge ASTM A-513 rectangular steel tube sway braces miter cut and welded in place to a top horizontal 4" x 1½" x 0.18" web ASTM A-36 steel channel. Sway braces shall attach to mast above backboard for maximum rigidity. Mast and sway braces shall be welded for ceiling heights up to thirty (30) feet. Mast and sway braces shall be clamped for ceiling heights over thirty (30) feet (Model 3106). Backstop shall be front braced and fold forward. Front brace assembly shall have a fully adjustable folding knee joint allowing for exact playing position and maintenance free operation.
- 3. Goal shall be mounted directly through backboard into a heavy structural steel weldment which shall be clamped to vertical 6-5/8'' O.D. center mast. (This direct attachment feature transfers the load on the goal directly to the mast pipe minimizing stress to glass backboard). Goal and backboard mounting design shall conform to NCAA, NFSHSA and FIBA regulations.
- 4. The all-welded "Single Post" design shall be suspended from custom adjustable hangers with bronze bushings designed to be offset no less than 4" behind the center line of gravity of mast, providing for proper weighting of the assembly and insuring that unit locks securely and automatically into playing position.

- 5. Backstop shall be supported from 3-1/2" O.D. pipe anchored to roof framing members by means of heavy formed steel support fittings. Superstructure pipes to be reinforced with special bridging or bracing when truss centers exceed spans of fourteen (14) feet. Each attachment clamp must be capable of supporting static loads of at least 10,000 lbs. with no deflection.
- 6. All metal parts shall have factory applied powder coat finish in standard black. Available colors: white, blue, red, gray, and yellow.
- 7. Folding Method: Electric Winch.

C. Rectangular Glass Backboards (Main Court):

- 1. Basis-of-Design: Model No. AFRG42 Aluminum Framed Rectangular Glass Backboard by Performance Sports Systems, Noblesville, IN.
- 2. Backboards shall be 42 inches high by 72 inches wide.
- 3. Backboard shall be manufactured from 1/2" tempered glass set in heavy extruded aluminum framing and cushioned by shock absorbing vinyl. Official border and target area permanently fired into glass.
- 4. Goal mounting structure shall be a heavy welded formed steel assembly, and directly attached to lower horizontal frame member to minimize stress on glass.
- 5. Backboard shall have limited lifetime warranty against defects in material and workmanship, and when used with Performance Sports System's Direct Goal Attachment feature shall be protected against shatter and breakage of glass. Board must meet NCAA, FIBA and NFSHSA specifications.

D. Fan Fiberglass Backboards (Side Courts):

- 1. Basis-of-Design: Model No. 1301B Fan Shaped Fiberglass Backboard by Performance Sports Systems, Noblesville, IN.
- 2. The 1354B backboard shall be molded from fiberglass with a tensile strength of 8,900 to 11,700 PSI and shall have 23% to 27% fiberglass content by weight. All surfaces shall be high gloss white in color with orange border and target silk screened on face of bank for permanent markings.
- 3. Board shall have goal mounting holes shall be on 5" horizontal and 5" vertical centers and holes on 3" horizontal and 3" vertical centers to accommodate a variety of goals.

E. Backboard Padding Kit:

- 1. Basis-of-Design: Model No. CE or NCE Adhered Backboard Padding by Performance Sports Systems, Noblesville, IN.
- 2. Pad consists of two pieces with molded type square corners.
- 3. Pads molded from Polyurethane Foam (minimum 9 pound density) with integral skin (self-skinning).
- 4. Provide a glue or peel and stick tape type attachment.
- 5. Pad meets all competition requirements of the NBA, NCAA, NFSHSA, and international requirements of FIBA.
- 6. Color to be selected.

F. Basketball Goal:

- 1. Basis-of-Design: Model No. 2000+ Breakaway Goal as manufactured by Performance Sports Systems, Noblesville, IN.
- 2. Goal shall be fabricated from 5/8" diameter cold drawn alloy steel round formed to an 18" inside diameter ring. Inside of ring shall be positioned 6" from face of backboard by heavy, formed steel hinged-type housing with removable cover to conceal mounting bolts and shock absorption mechanism of goal and to protect against finger entrapment.

- 3. Goal shall be designed to absorb shock loads from slam dunking or hanging on rim. Shock absorption feature shall be provided by means of a special offset hinge arrangement rim and back plate mounting housing with concealed molded rubber shock absorber.
- 4. Goal shall meet NCAA, FIBA and NFSHSA specification on moveable rims, which states, "A moveable basket ring shall have rebound characteristics identical to those of a non-moveable ring." Goal shall be factory set to proper flex and rebound requirements.
- 5. Goal shall be finished in durable, electrostatic powder coated official orange finish.
- 6. Goal shall be furnished complete with heavy-duty white anti-whip nylon netting and mounting hardware.

G. Electric Winch:

- 1. Basis-of-Design: Model No. 1194 Electric Backstop Winch by Performance Sports Systems, Noblesville, IN.
- 2. Electric winch shall be a definite purpose electric winch designed specifically for use of basketball backstop positioning. Winch shall be worm gear type designed to hold backstop at any position during operation. Winch will be driven by a 3/4 HP, 120-volt, 60 hertz, single-phase instant reversing electric motor with thermal overload protection (governed to stall at 14 amps to prevent overload) and manufactured to NEMA specifications. Winch shall develop over 1000 lbs. of line pull at a speed of nine (9) feet per minute.
- 3. Winch shall have high-speed worm gearing to support both radial and thrust loads, and positive locking double reduction gear drive providing 200:1 reduction rate for strong cable hold under load, eliminating need for special brakes. Sealed gear case for lifetime maintenance free operation.
- 4. Winch shall incorporate a large 4-1/2" diameter grooved drum to assure long cable life and proper coiling, with a tension roller for correct cable tracking even in slack conditions. Drum shall be grooved for 1/4" 7 x 19 galvanized aircraft cable to facilitate smooth take-up and proper spooling of cable. Drum shall allow 25 feet of travel on one (1) layer and 40 feet on two (2) layers.

5. Operation:

- a. Winch shall utilize a flush mounted single keyed switch to both raise and lower backstop. Key switch shall be located so that the backstop is in full view of authorized operator at all times.
- 6. Winch shall have five (5) year warranty against material defects and workmanship. Winches with less than a five (5) year warranty shall not be considered equal.

H. Backstop Auto Lock Safety Strap:

- 1. Basis-of-Design: Model No. 1100 Safstop safety strap by Performance Sports Systems, Noblesville, IN.
- 2. Provide one for each backstop.
- 3. Safety strap shall be inertia sensitive to automatically lock basketball backstop in position at any time (in storage or during raising or lowering cycle) due to any sudden surge of speed created by possible malfunction(s) of hoisting apparatus, winch, cable, pulleys, support fittings, etc.
- 4. Safety strap shall incorporate a two (2) inch wide nylon belt rated at 6,000 lbs. breaking strength. Entire unit to be tested to withstand 1,500 lb. free fall load and rated at 1000 lbs. Strap shall extend a maximum of 35'-0" and shall be automatically retracted and stored on a reel equipped with a special negator type constant force spring. Operation and locking action of strap shall be set by inertial force for immediate and positive setting, or

- centrifugal force to instantly lock basketball backstop before unit can gain momentum. Unit shall incorporate a fully automatic reset requiring no poles, ropes, levers or buttons.
- 5. Safety strap shall be furnished with universal mounting bracket to fit 3-1/2" O.D. pipe mounted either parallel or at right angles to backboard. Belt shall be supplied with an auto-lock belt clamp for ease of securing directly to basketball backstop.
- I. Electric Basketball Backstop Height Adjuster:
 - 1. Basis-of-Design: Model No. 1170 Electric Adjust-A-Goal by Performance Sports System, Noblesville, IN.
 - 2. Electric height adjuster shall be manufactured of steel using an electrically operated linear actuator to raise and lower backboard from 8' to 10' off of finished floor. Linear actuator shall be powered by a 115 volt single-phase motor and contain built in limit switches to ensure safe operation and positive stopping at 8' and 10' heights. Height adjuster to mount directly to goal attachment to transfer load of play directly through backboard to support structure.
 - a. Height adjuster shall be operated with a flush mounted single keyed switch.

2.5 GROUP CONTROLLER

- A. Basis-of-Design: Model TSC1500 by Performance Sports Systems, Noblesville, IN.
- B. The total system control 1500 will feature a tri color LED and a buzzer to provide feedback to the user during operation. The system shall also include an LED at the relay to show. The LED will turn green and buzz when a proper entry has been made. It will turn yellow when awaiting choice of device. LED will be flashing red when powered. Key pad is fuse protected at the master relay board for circuit protection.
- C. System will operate equipment individually and has custom programming options for multiple equipment configurations, such as "game day" or 'practice" set up. The system shall have unlimited expandability for operation of additional equipment and will be capable of being reporgrammed by the Owner.
- D. Password controlled system to prevent unauthorized operation with auto shut-off after thirty seconds of non-use.
- E. Self diagnostic programming with voltage sensing shutdown feature in case of overload, LCD read-out of system alert and recommended maintenance, if required.
- F. Relay Panel to have back-up switches to operate equipment in the event of key pad or touch screen failure.

2.6 SAFETY PADS

- A. Basis-of-Design; Model No. 4120 Wall Padding as manufactured by Performance Sports Systems, Noblesville, IN.
 - 1. Panels 2 feet wide x 6 feet high.
 - 2. Construct panels of 6 pound density bonded urethane foam filler cemented to 7/16 inch OSB backing board and covered with 14 ounce vinyl laminated material which shall be mildew and rot-resistant, and fortified with an infection combating fungicide and shall be stapled securely to back of plywood; cover material tear strength of 100 psi.
 - a. No added urea formaldehyde for plywood and laminating adhesive.
 - 3. Provide 1 inch nailing margin at top and bottom.
 - 4. Cutouts in panels shall be made in field to fit job conditions.
 - 5. Color: As selected by Architect from manufactuers full range of colors.

2.7 FLOOR SLEEVES FOR PIPE STANDARDS

- A. Floor Sleeves with Chrome Covers: Senoh Floor Plate and Sleeve KA25 (for Volleyball) and KA45 (for Badmitton). Provide coverplates from Senoh to coordinate with floor plates.
- B. Cover plate consists of molded plastic recessed mounting flange, cork gasket and a 5-inch diameter chrome plated cover.
- C. Cover shall be equipped with a swivel type retainer pin to prevent theft.
- D. Special key shall be provided for cover removal.
- E. Sleeve shall be 3-3/4 inch O.D. heavy wall steel tubing extending 9 inches into concrete footing.
- F. Bottom of sleeve to be capped with a 4-inch square anchor plate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for play court layout, alignment of mounting substrates, installation tolerances, operational clearances and other conditions affecting performance.
 - 1. Verify critical dimensions.
 - 2. Examine supporting structure.
 - 3. Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements have been clearly marked. Locate reinforcements and mark locations.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written installation instructions. Complete equipment field assembly, where required.
- B. Unless otherwise indicated, install gymnasium equipment after other finishing operations, including painting, have been completed.
- C. Permanently Placed Gymnasium Equipment and Components: Rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated on Shop Drawings; in proper relation to adjacent construction; and aligned with court layout.
 - 1. Operating Gymnasium Equipment: Verify clearances for movable components of gymnasium equipment throughout entire range of operation and for access to operating components.
- D. Wall Safety Pads: Mount with bottom edge at 4 inches above finished floor.
- E. Anchoring to In-Place Construction: Use anchors and fasteners where necessary for securing built-in and permanently placed gymnasium equipment to structural support and for properly transferring load to in-place construction.

3.3 ADJUSTING

A. Adjust movable components of gymnasium equipment to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

3.4 CLEANING

- A. After completing gymnasium equipment installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.
- B. Replace gymnasium equipment and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gymnasium equipment. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 11 66 43 - BASKETBALL SCOREBOARD

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Single-sided LED basketball scoreboard.
- B. Related Sections include the following:
 - 1. Division 11 Section "Basketball Shot Timer Scoreboard."

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's product illustrations, data, and literature that fully describe the scoreboards and accessories proposed for installation.
- B. Shop Drawings: Show installation details including wiring diagrams.
- C. Operation and Maintenance Data: To include in operation and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Submittals."
- D. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of scoring equipment specified in this section and other sections through one source from a single manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- C. Regulatory Requirements: Fabricate and label shot timer scoreboard to comply with the following:
 - 1. ETL listed to UL Standards 48 and 1433.
 - 2. NEC compliant.
 - 3. FCC compliant.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store scoreboard and equipment in a clean, dry environment.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.
- B. Environmental Limitations: Do not install scoring 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.
- C. Supply weight and mounting method to verify that building structure is capable of supporting the scoreboard's weight in addition to the auxiliary equipment.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of shot timer scoreboards that fail in materials or workmanship within specified warranty period.
 - 1. Faulty operation of equipment.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty Period: 5 years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Provide an exchange program to supply replacement parts for components that fail during the coverage period. To minimize downtime, the exchange parts shall be shipped on the same day the order is received or on the following day. The manufacturer will also enclose an air bill for return of the defective components.
- B. Provide access to a local authorized service company.
- C. Provide a help desk staffed by experience technicians and coordinators who are thoroughly familiar with the scoreboard and available for technical support. The staff must be available at no additional cost to the customer and provide an "on-call" service during weekends.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Daktronics.
- B. Other acceptable manufacturers:
 - 1. Nevco.
 - 2. Sportable Scoreboards.
 - 3. Fair-Play A Trans-Lux Company.

2.2 SCOREBOARD

- A. Basis-of-Design Product: The design for scoreboard is based on Daktronics, Inc.; BB-2107.
- B. General: Single-sided basketball scoreboard that also scores volleyball and wrestling. It scores HOME and GUEST to 199, PERIOD to nine, team FOULS to 99, PLAYER number to 99, player FOUL to 9, T.O.L (time outs left) to 9, indicates possession and bonus, displays period time to 99:59 and during the last minute of the period, it displays time to 1/10 of a second.
 - 1. Dimensions: 6'-0" high, 10'-0" wide, 0'-6" deep.
 - 2. Weight: 225 lbs.
 - 3. Power Requirements: 200 W.
 - 4. Color: To be selected by Architect from minimum 100 colors.
- C. Construction: Aluminum cabinet capable of withstanding high-velocity impact from indoor sports balls without the need for protective screens, as follows:
 - 1. Face and Perimeter: 0.063 inch thick.
 - 2. Back: 0.050 inch thick.
 - 3. Digit Faceplates: 0.063 inch thick.

D. Digits:

- 1. AS AllnGaP LED digits.
- 2. Seven bar segments per digit.

- 3. LED Digit Technology: A diffusant over the LEDs blends the light achieving a uniform look with 140 degree maximum viewing angle.
- 4. Clock and Score Digits: 13 inches high.
- 5. PERIOD and time outs left digits: 10 inches high.
- 6. Clock, Colon, PERIOD Digits and Bonus Indicators: Amber LEDs.
- 7. Score Digits and Possession Indicators: Red LEDs.

E. Captions:

- 1. HOME and GUEST Captions: 6 inches high.
- 2. PERIOD Caption: 4 inches high.
- 3. All Captions: White vinyl applied directly to scoreboard face.
- F. Logo/Sponsor Panels: There is space for two 17" high, 33" wide logo/sponsor panels on the top corners of the scoreboards.

G. Horn:

- 1. Vibrating Horn: Mounts behind scoreboard face.
- 2. Sounds automatically when shot clock counts down to zero.
- 3. Sounds manually as directed by operator.

H. Power Cord:

- 1. Cord is 11 feet long.
- 2. Cord plugs into a standard grounded 120 V AC outlet.

2.3 SCORING CONSOLE

- A. Basis-of-Design Product: The design for shot timer scoreboard is based on Daktronics, Inc.; All Sport 5000.
- B. Capable of scoring basketball, volleyball, and wrestling through the use of keyboard inserts.
- C. Capable of controlling other scoreboards.
- D. Console has a maximum power requirement of 5 watts.
- E. Console recalls clock, score, and period information if power is lost.

F. Console Include:

- 1. Aluminum enclosure to house electronics.
- 2. Sealed membrane water-resistant keyboard.
- 3. 32-character liquid crystal prompting display to verify entries and recall information currently displayed.
- 4. 6-foot-long power cord to plug into a standard grounded 120 VAC outlet.
- 5. Practice timer mode:
 - a. Can sound horn at the end of each segment.
 - b. Has 99 programmable segments.
 - c. Displays the segment number and segment length.
 - d. Has a programmable interval time.
- 6. Portable signal kit.
- 7. 2.4 GHz spread spectrum radio for scoreboard control.
- 8. Battery pack.

2.4 FACTORY FINISHES

A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

2.5 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for, installation tolerances, and other conditions affecting performance of work.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide conduit cables and outlet boxes.

3.3 INSTALLATION

- A. Mount scoreboards in location detailed and in accordance with manufacturer's instructions. Unit to be plumb and level.
- B. Test the operation of the scoreboard and controller; leave control unit in carrying case and other loose items with Owner.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain shot timer scoreboards. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 11 66 47 - BASKETBALL SHOT TIMER SCOREBOARD

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Single-sided shot timer LED basketball scoreboard.
- B. Related Sections include the following:
 - 1. Division 11 Section "Basketball Scoreboard."

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's product illustrations, data, and literature that fully describe the scoreboards and accessories proposed for installation.
- B. Shop Drawings: Show installation details including wiring diagrams.
- C. Operation and Maintenance Data: To include in operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Submittals."
- D. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of scoring equipment specified in this section and other sections through one source from a single manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- C. Regulatory Requirements: Fabricate and label shot timer scoreboard to comply with the following:
 - 1. ETL listed to UL Standards 48 and 1433.
 - 2. NEC compliant.
 - 3. FCC compliant.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store scoreboard and equipment in a clean, dry environment.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.
- B. Environmental Limitations: Do not install scoring 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.
- C. Supply weight and mounting method to verify that building structure is capable of supporting the scoreboard's weight in addition to the auxiliary equipment.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of shot timer scoreboards that fail in materials or workmanship within specified warranty period.
 - 1. Faulty operation of equipment.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty Period: 5 years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Provide an exchange program to supply replacement parts for components that fail during the coverage period. To minimize downtime, the exchange parts shall be shipped on the same day the order is received or on the following day. The manufacturer will also enclose an air bill for return of the defective components.
- B. Provide access to a local authorized service company.
- C. Provide a help desk staffed by experience technicians and coordinators who are thoroughly familiar with the scoreboard and available for technical support. The staff must be available at no additional cost to the customer and provide an "on-call" service during weekends.

PART 2 PRODUCTS

2.1 SHOT TIMER SCOREBOARD

- A. Basis-of-Design Product: The design for shot timer scoreboard is based on Daktronics, Inc.; BB-2115-15.
- B. General: Single-sided shot timer basketball scoreboard that displays game and event time including 1/10 second timing during the last minute, shot times up to a value of 99 seconds and counts down from any preset number between 0 and 99.
 - 1. Dimensions: 2'-4" high, 2'-5" wide, 0'-6" deep.
 - 2. Weight: 30 lbs.
 - 3. Power Requirements: 200 W.
 - 4. Color: To be selected by Architect from minimum 150 colors.
- C. Construction: Aluminum cabinet capable of withstanding high-velocity impact from indoor sports balls without the need for protective screens, as follows:
 - 1. Face and Perimeter: 0.063 inch thick.
 - 2. Back: 0.050 inch thick.
 - 3. Digit Faceplates: 0.090 inch thick.

D. Digits:

- 1. AS AllnGaP LED digits.
- 2. Seven bar segments per digit.
- 3. LED Digit Technology: A diffusant over the LEDs blends the light achieving a uniform look with 140 degree maximum viewing angle.
- 4. Clock Digits: 7 inches high.
- 5. Other Digits: 13 inches high.
- 6. Clock Digits: Amber LEDs.
- 7. Other Digits: Red LEDs.

E. Horn:

1. Vibrating Horn: Mounts behind scoreboard face.

2. Sounds automatically when shot clock counts down to zero.

F. Power Cord:

- 1. Cord is 11 feet long.
- 2. Cord plugs into a standard grounded 120 V AC outlet.

2.2 SCORING CONSOLE

A. Basis-of-Design Product: Refer to Section 11 66 43.

2.3 FACTORY FINISHES

A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for, installation tolerances, and other conditions affecting performance of work.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide conduit cables and outlet boxes.

3.3 INSTALLATION

- A. Mount shot clock to backstop brackets in location detailed and in accordance with manufacturer's instructions. Unit to be plumb and level.
- B. Test the operation of the scoreboard and controller; leave control unit in carrying case and other loose items with Owner.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain shot timer scoreboards. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 11 66 53 - GYMNASIUM DIVIDER

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes gymnasium divider curtain.
- B. Related Sections include the following:
 - 1. Division 26 Sections for electrical service for motor operators, controls, and other powered devices for motorized gymnasium divider.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. If applicable, include assembly, disassembly, and storage instructions for removable equipment.
 - 2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation including loads, point reactions, and locations for attachment of gymnasium dividers to structure.
- D. Samples for Initial Selection: For each type of gymnasium divider curtain fabric indicated.
- E. Samples for Verification: For divider curtain fabric, not less than 12 inches square of open mesh, and of opaque fabric.
- F. Product Certificates: For each type of gymnasium divider, signed by product manufacturer.
- G. Qualification Data: For installer and professional engineer.
- H. Operation and Maintenance Data: For gymnasium dividers to include in emergency, operation, and maintenance manuals.
- I. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of gymnasium divider from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install gymnasium divider 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 for gymnasium divider.

1.5 COORDINATION

A. Coordinate installation of overhead-supported gymnasium divider and suspension system components with other construction including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of gymnasium divider that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, faulty operation of gymnasium dividers.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extruded Bars, Profiles, and Tubes: ASTM B 221.
 - 2. Cast Aluminum: ASTM B 179.
 - 3. Flat Sheet: ASTM B 209.
- B. Steel: Comply with the following:
 - 1. Steel Plates, Shapes, and Bars: ASTM A 36.
 - 2. Steel Tubing: ASTM A 500 or ASTM A 513, cold formed.
 - 3. Steel Sheet: ASTM A 1011.
- C. Support Cable: Manufacturer's standard galvanized steel aircraft cable with a breaking strength of 7000 lb. Provide fittings complying with cable manufacturer's written instructions for size, number, and method of installation.
- D. Support Chain and Fittings: Grade 80 hardened alloy steel chain rated for overhead lifting, ASTM A 391/A 391M, with commercial-quality, hot-dip galvanized steel connectors and hangars.
- E. Castings and Hangers: Malleable iron, ASTM A 47, grade required for structural loading.
- F. Anchors, Fasteners, Fittings and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed; tamperproof, vandal- and theft-resistant design.

2.2 DIVIDER CURTAIN

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Basis-of-Design: Performance Sports Systems, Model 4020; www.perfsports.com.
 - 2. Draper Inc.
 - 3 Porter Athletic
- B. Divider Curtain: Electrically operated, folding, and as follows:
 - 1. Upper Curtain, Mesh: Woven fabric of 100 percent polyester yarn coated with PVC weighing not less than 6.5 oz./sq. yd.
 - a. Mesh Color: As selected by Architect from manufacturer's full range.
 - 2. Lower Curtain, Solid: Woven polyester coated with PVC, minimum 18 oz./sq. yd, embossed, 8-foot height above floor.
 - a. Fabric Color: As selected by Architect from manufacturer's full range.
- C. Curtain Fabrication: Fused seams and the following:
 - 1. Top Hem: Reinforce with double thickness mesh for grommets and continuous pipe batten
- D. Accessories:

- 1. Grommets: Manufacturer's standard size and spacing, for snaps or S-hooks.
- 2. Proof Coil Chain: Grade 30, No. 8, zinc plated, 3/16 inch, ASTM A 413.
- 3. Curtain Battens: Fabricate battens from steel pipe with a minimum number of joints. As necessary for required lengths, connect pipe with drive-fit pipe sleeve not less than 18 inches long, and secure with 4 flush rivets, plug welds, threaded couplings, or another equally secure method. Shop-paint completed pipe battens with black paint.
 - a. Steel Pipe: ASTM A 53, Grade A, standard weight (Schedule 40), black, 1-1/2-inch nominal diameter, unless otherwise indicated.
- E. Divider Curtain Operator: Drive pipe.
- F. Divider Curtain Electric Operator: Provide operating machine of size and capacity recommended by manufacturer for equipment specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, and remote controls. Coordinate wiring requirements and electrical characteristics with building electrical system.
 - 1. Operator Type: Electric motor, enclosed gear-head-reduction drive, with chain and sprocket secondary drive.
- G. Motor Characteristics: Sufficient to start, accelerate, reverse, and operate connected loads at designated speeds within installed environment and with indicated operating sequence, and without exceeding nameplate rating or considering service factor. Comply with NEMA MG 1, and the following:
 - 1. Voltage: Coordinate with Electrical Construction Documents.
 - 2. Horsepower: 3/4 hp.
 - 3. Enclosure: Manufacturer's standard.
 - 4. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
 - 5. Remote-Control Station: Key pad control system; NEMA ICS 6, Type 1 enclosure for recessed or flush mounting.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for alignment of mounting substrates, installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.
 - 1. Verify critical dimensions.
 - 2. Examine supporting structure.
 - 3. Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements have been clearly marked. Locate reinforcements and mark locations.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written installation instructions. Complete field assembly, where required.
- B. Unless otherwise indicated, install gymnasium dividers after other finishing operations, including painting, have been completed.

- C. Gymnasium Divider and Components: Rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated on Shop Drawings; in proper relation to adjacent construction; and aligned with court layout.
 - 1. Verify clearances for movable components of gymnasium divider throughout entire range of operation and for access to operating components.
- D. Connections: Connect automatic operators to building electrical system.

3.3 ADJUSTING

A. Adjust movable components of gymnasium divider to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

3.4 CLEANING

- A. After completing gymnasium divider installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.
- B. Replace gymnasium divider components and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gymnasium divider. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 12 21 13 - HORIZONTAL LOUVER BLINDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Horizontal slat louver blinds.
- B. Operating hardware.

1.2 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating physical and dimensional characteristics and operating features.
- C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- D. Samples: Submit two samples, 18 inch long illustrating slat materials and finish, cord type and color.

1.3 PROJECT CONDITIONS

- A. Coordinate the work with window installation and placement of concealed blocking to support blinds.
- B. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 specifications.
- C. Take field measurements to determine sizes required.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hunter Douglas; Model CD80: www.hunterdouglas.com.
- B. Levolor Contract; Riviera Classic DustGuard 1-inch Blind: www.levolorcontract.com.
- C. SWFcontract, a division of Spring Window Fashions, LLC.; Bali Classic Custom Mini Blind Series 3000: www.swfcontract.com.

2.2 FABRICATION

- A. Fabricate blinds to fit within openings with uniform edge clearance of 3/8 inch.
- B. At openings requiring multiple blind units, provide separate blind assemblies with space of 1/4 inch between blinds, located at window mullion centers.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with flush countersunk fasteners.

3.2 TOLERANCES

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch.
- B. Maximum Offset From Level: 1/8 inch.

3.3 ADJUSTING

A. Adjust blinds for smooth operation.

3.4 CLEANING

A. Clean blind surfaces just prior to occupancy.

END OF SECTION

SECTION 12 24 13 - WINDOW SHADE SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes room darkening roller shades and motorized shade operators.
 - 1. Location of manual or electrical shades as indicated on Drawings.
 - 2. Reference Add Alternate 1.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
 - 1. Motorized Shade Operators: Include operating instructions.
 - 2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
- B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.
 - 1. Motorized Shade Operators: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
 - 2. Wiring Diagrams: Power, system, and control wiring.
- C. Samples for Initial Selection: For each colored component of each type of shade indicated.
 - 1. Include similar Samples of accessories involving color selection.

D. Samples for Verification:

- 1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated.
- 2. For the following products:
 - a. Shade Material: Not less than 3 inches square, with specified treatments applied. Mark face of material.
 - b. Fascia: Full-size unit, not less than 12 inches long.
 - c. Complete parts box containing motorized shade hardware.
- E. Product Certificates: For each type of roller shade, signed by product manufacturer.
- F. Qualification Data: For Installer.
- G. Product Test Reports: For each type of roller shade.
- H. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining roller shades and finishes.
 - 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 - 3. Operating hardware.
 - 4. Motorized shade operator.

1.3 OUALITY ASSURANCE

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

B. Source Limitations:

- 1. Obtain roller shades through one source from a single manufacturer.
- 2. To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:
 - a. Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the Electrical Drawings.
 - b. Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
 - c. Roller shade installer/dealer shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
 - d. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/ control locations designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction.
 - e. Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.
- C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Flame-Resistance Ratings: Passes NFPA 701.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Product Standard: Provide roller shades complying with WCMA A 100.1.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory packages, marked with manufacturer and product name and location of installation.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Store, handle, protect and install absorptive materials, including fabrics materials, in accordance with the Construction IAQ Management Plan required by Division 1 specifications.

C. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

16 WARRANTY

- A. Motorized Components (exclusive of shade motors and motor logic control systems and components): Twenty-five Years Fit for (intended) use per published terms and conditions, from the Date of Substantial Completion and contain provisions that installation is to remain operational without fault for the warranty period; and, include all operating parts, including shade band.
- B. Shade motors and motor logic control systems: Five years from Date of Substantial Completion for shade motors and motor logic control systems and components. Motorized shade installation will remain operational without fault for the warranty period and include all operational parts.
- C. Installation: Provide roller shade installer's warranty that installation shall be free of defects for a period of not less than 1 year.
- D. In the event of a warranted product failure, the roller shade installer will, at no cost to Owner, facilitate acquisition and delivery of all necessary components to the Owner. Owner will provide roller shade dealer/installer with direct access to the work, during dealer/installer's normal business hours.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Rollers Shades: Before installation begins, for each size, color, texture, and pattern indicated, full-size units equal to 5 percent of amount installed, or portion thereof.
 - 2. Shade Motors: 5 additional.

PART 2 PRODUCTS

2.1 ROLLER SHADES

- A. Basis-of-Design Products:
 - 1. Roller Shades: Subject to compliance with requirements, provide MechoShade and ElectroShade by MechoShade Systems or equivalent products by Draper or Lutron.
- B. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
 - 1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
 - 2 Shade band and Shade Roller Attachment:
 - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch in diameter for manual shades, and less than 2.55 inches for motorize shades are not acceptable.

- b. Provide for positive mechanical engagement with drive / brake mechanism.
- C. Access and Material Requirements:
 - 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
 - 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
 - 3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.
- D. Shade Brackets: Provide shade hardware constructed of minimum 1/8-inch thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
- E. Motorized Shade Hardware and Shade Brackets:
 - 1. Provide shade hardware constructed of minimum 1/8-inch thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
 - 2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
 - 3. Basis-of-Design: ElectroShade II; with bottom slot opening.
- F. Manual Shade Bracket: Mecho/5.
- G. Fascia: Provide where indicated on Drawings.
 - 1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
 - 2. Fascia shall be able to be installed across two or more shade bands in one piece.
 - 3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
 - 4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
- H. Mounting: Wall extension brackets mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.
- I. Shade Operation Motorized operator: Locations indicated.
 - 1. Shades for each area shall function in groups as indicated on the drawings; all shades and all sides raising and lowering simultaneous, as Thermoveil Shadecoloth.
 - 2. Shades on same local switch.

2.2 ROLLER SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch in either direction per 8 feet of shade height due to warp distortion or weave design. Fabricate hem as follows:
 - 1. Concealed hem tube (Translucent Shades).
- C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth

within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

2.3 MANUAL OPERATED CHAIN DRIVE HARDWARE AND BRACKETS

- A. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
- B. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
- C. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
- D. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
- E. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
- F. Drive Bracket / Brake Assembly:
 - 1. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
 - 2. The entire assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
- G. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.4 MOTORIZED ROLLER SHADE OPERATORS

- A. Basis-of-Design Product: Specifications and design of shade motors and motor control system are based on the IQ/MLC motor logic control system manufactured by MechoShade Systems, Inc. Other systems may be acceptable provide that all of the following performance capabilities are provided. Motor logic control systems not in complete compliance with these performance criteria shall not be accepted as equal systems.
- B. General: Provide factory-assembled motorized shade operation systems designed for lifting shades of type, size, weight, construction, use, and operation frequency indicated. Provide operation systems of size and capacity and with features, characteristics, and accessories suitable for Project conditions and recommended by shade manufacturer, complete with electric motors and factory-prewired motor controls, remote-control stations, power disconnect switches, enclosures protecting controls and all operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with the building electrical system.
- C. Comply with NFPA 70.
- D. Control Equipment:
 - 1. Provide power to each shade motor via individual 3 conductor line voltage circuits connecting each motor to the relay based motor logic controllers (IQ/MLC).

- 2. Control system components shall provide appropriate (spike and brown out) over-current protection (+/- 10 percent of line voltage) for each of the four individual motor circuits and shall be rated by UL or ETL as a recognized component of this system and tested as an integrated system.
- 3. Control system shall allow for automatic alignment of shade hem bars in stopped position at 25 percent, 50 percent, and 75 percent of opening heights, and up to three user-defined intermediate stopping positions in addition to all up / all down, regardless of shade height, for a total of five positions. Control system shall allow shades to be stopped at any point in the opening height noting that shades may not be in alignment at these non-defined positions).
- 4. Control system shall have two standard operating modes: Normal mode allowing the shades to be stopped anywhere in the window's opening height and uniform mode, allowing the shades to only be stopped at the predefined intermediate stop positions. Both modes shall allow for all up / all down positioning.
- 5. Control system shall allow high rpm motors for shades over means of egress doors to be raised by input from building life safety system (at a speed / rpm determined by building code having jurisdiction), in addition to other modes of operation described in this specification.
- E. Electric Motors: UL-approved or -recognized, totally enclosed, insulated motor, complying with NEMA MG 1, with thermal-overload protection, brake, permanently lubricated bearings, and limit switches; sized by shade manufacturer to start and operate size and weight of shade considering service factor or considering Project's service conditions without exceeding nameplate ratings.
 - 1. Service Factor: According to NEMA MG 1, unless otherwise indicated.
 - 2. Motor Characteristics: Single phase, 110 V, 60 Hz.
 - 3. Motor Mounting: Within manufacturer's standard roller enclosure.
- F. Remote Controls: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following devices for remote-control activation of shades:
 - Control Stations:
 - a. Three-button architectural flush mounted switches with metal cover plate and no exposed fasteners.
 - b. Connect local wall switches to control system components via low voltage (12V DC) 4-conductor modular cable equipped with RJ-11 type connectors supplied, installed and certified under Division 16 Electrical

2.5 SHADE CLOTH

- A. Translucent Single-Fabric Shadecloth: MechoShade Systems, Inc., EcoVeil group, 100 percent thermoplastic olefin.
 - 1. Shading:
 - a. Roller Shades: EcoVeil "1550 Series", 3 percent open.
- B. Color: Selected from manufacturer's standard colors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.

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

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions. Allow clearances for window operation hardware.
- B. Connections: Connect motorized operators to building electrical system.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades.

END OF SECTION

SECTION 12 35 50 - EDUCATIONAL CASEWORK

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes plastic laminate casework and related items including, but not limited to, countertops, back splashes, filler panels, and scribe pieces, as necessary for complete installation.
 - 1. Related Sections include the following:
 - a. Division 8 Section "Resilient Flooring" for resilient wall base.
 - b. Division 25 Sections for sinks and fittings in countertops.
 - c. Division 26 Sections for electrical fittings and outlets.

1.2 SUBMITTALS

- A. Product Data: For each type of educational casework unit specified.
- B. Shop Drawings: Include plan layout, elevations, ends, cross-sections, location and type of service fittings, required clearances, methods of assembly and reassembly, design and arrangements.
- C. Samples for Selection: Manufacturer's color charts and material samples showing full range of colors, textures, and finishes. Submit a basic container unit with shelves, dividers, base and hardware. Samples must have cutaways to clearly demonstrate materials, construction, workmanship, and finish.
- D. Sample for Verification: Submit full size sample of typical cabinet which may be incorporated into the Work if in good condition and approved by Architect. Owner may take one cabinet unit off site for deconstructive testing. Cabinet will be selected at random. Replace unit at no extra cost to Owner.
- E. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.
- F. Maintenance Data: For educational casework to include in maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage a firm specializing in installation of casework for a minimum of 5 years and acceptable to manufacturer.
- B. Product Designations: Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Unless modified by notation on Drawings, or otherwise specified, catalog description for designated product constitutes requirements for each product and establishes a standard of design and quality for materials, construction and workmanship. Other acceptable manufacturers' laboratory casework of similar sizes, similar door and drawer configurations, and complying with the Specifications will be accepted
- C. Single Source Responsibility: To assure coordinated unit design, all items in each room or space, other than appliances and special equipment specified in other Sections, shall be products of one manufacturer to the greatest extent possible.
- D. Quality Standard: Except as otherwise indicated, comply with the following standards:
 - 1. AWI Cabinet Quality Standard: AWI Section 1600.
 - 2. AWI Countertop Quality Standard: AWI Section 400C.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Administrative Requirements."

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating educational casework without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of educational casework that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: 3 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Case Systems, Inc.
 - 2. LSI Corp. of America, Inc.
 - 3. The Mastercraft Woodworking Company.
 - 4. Stevens Cabinet Company, Inc.
 - 5. TMI Systems Design Corporation.
 - 6. Paragon Casework.
 - 7. Cabinets By Design, Inc.

2.2 MATERIALS

- A. High Pressure Decorative Laminate: NEMA LD3, grades as indicated.
 - 1. Plastic Laminate: Vertical General Purpose Grade (VGS), 0.030-inch nominal thickness; for exterior cabinet surfaces, interiors of open cabinets, and underside of wall cabinets.
 - 2. Plastic Laminate Balancing Sheet: Cabinet Liner Grade (CLS), 0.020-inch nominal thickness, white high-pressure cabinet liner, for balancing exterior laminate surfaces.
- B. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Nevamar; International Paper; Decorative Products Div.
 - c. Wilsonart International; Div. of Premark International, Inc.
 - 2. Colors: As selected by Architect from manufacturer's full range of finishes and colors consisting of both patterns and solid colors. Provide a minimum of 100 patterns/colors to select from.

- 3. End panels may match face or may be a color as selected from manufacturer's standard finishes and colors.
- 4. A maximum total of 12 different casework colors will be selected for this Project. All exposed exterior elements including edges, door and cabinet sides, and exposed backs shall be available in matching color.
- C. Pressure Fused Laminate: Melamine resin impregnated, 90 gram PSM minimum, thermofused to core under pressure, complying with NEMA LD3 VGS and NEMA LD3 CLS standards.
 - 1. Provide white pressure fused laminate for cabinet interiors behind doors and drawers.
 - 2. Provide balanced construction at all concealed surfaces with thermofused melamine. Unsurfaced coreboard or simple backers will not be accepted.
- D. Plywood complying with DOC PS 1.

E. Hardboard:

- 1. Hardboard shall meet or exceed Commercial Standards CS-251 and Federal Specifications LLL-B-00810.
- 2. Tempered Hardboard 1/4 inch thick, smooth both sides.
- 3. Hardboard exposed one side to be 1/4 inch thick, prefinished in putty color to match cabinet interior. Opposite face prefinished with neutral color balance coating.

F. Edging Materials: Comply with the following:

- 1. Exposed Exterior Cabinet Edges, Interior Dividers, Drawer Bodies, and Shelves: Banded with matching material, resistant to chipping, cracking, and high impact, applied with waterproof hot melt adhesive.
- 2. Door and Drawer Front Edges: Banded with contrasting or matching PVC extrusion, 3 mm thick, resistant to chipping, cracking, and high impact, applied with waterproof hot melt adhesive, and shaped to provide radiused edges and corners.
- 3. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.

G. Hardware:

- 1. Hinges: Hinges fully concealed from view when door is in closed position and shall permit 176-degree door swing. Hinge crank of heavy duty steel with a concealed integral self-closing spring mechanism. Hinge bosses of heavy duty diecast steel. Nylon expansion inserts to be provided in door for positive screw attachment. Hinge shall incorporate mounting features providing three-dimensional adjustment. Hinges to have lifetime guarantee as warranted by manufacturer. Doors less than 48 inches in height with 2 hinges per door, doors 48 to 63 inches in height with 3 hinges per door and all doors in excess of 63 inches with 4 hinges per door.
- 2. Wire Pulls: Stainless steel, accurately positioned on door and drawer front with #8-32 screws.
- 3. Door Catch: Heavy duty, spring-loaded, large roller type. Each door with a single catch mounted at the bottom edge. All mobile cabinets and doors over 48 inches high with a catch at both top and bottom of door.
- 4. Catch Strike Plate: Injection molded nylon, almond color, with integral molded engagement ridge. Strike plate to also provide a wide face bumper insuring a positive door stop.
- 5. Hanger Rods: 1-inch diameter heavy gage plated tubing, securely affixed in cabinet with injection molded rod sockets.

- 6. Drawer and Slide-Out Shelf Slides: Nylon roller steel slides to insure quiet, smooth operation. 100-lb load rating with built-in drawer stop and self-close feature in the last 1-inch of travel.
- 7. File Drawer Slides: Full extension steel slides with ball bearing nylon rollers. 100-lb. load rating.
- 8. Locks: Cylinder type, diecast, with 5 disc tumbler mechanism. Each lock to be provided with a milled brass key with keying options of keyed alike, keyed different, and master keyed locks, as selected by Owner. Provide locks on all cabinet doors and drawers, except sink and fumehood base cabinets.
- 9. Grommets: Plastic or metal, 1.5-inch-diameter, placed at each computer station.

H. Adjustable Shelf Support System:

- 1. Support Clips for Adjustable Shelves: 3/4-inch-and 1-inch-thick, injection molded nylon, incorporating integrally molded lock tabs to retain shelf from tipping or inadvertently being lifted out. Support clip to have double pin engagement into precision bored hole pattern in cabinet vertical members, with molded ridge in the clip body to provide additional pressure against edge of shelving and to maintain positive pin engagement. Clip shall be designed to provide means to permanently attach shelf to support clips. Static test load must exceed 200-lb per clip.
- 2. Vertical and Horizontal Shelf Dividers: 1/4-inch-thick, fully adjustable and retained with injection molded nylon support clip designed to trap divider to eliminate inadvertent lift out.
- 3. Adjustable Shelves and Dividers: Adjustable at 1.25 inches o.c. through full height of compartment.
- I. Wardrobe Clothes Pole: 1-1/16-inch chrome steel rod LH-362.
- J. Wardrobe Clothes Pole Socket: Knape & Vogt #734 Flange Chrome.

K. Coat Hooks:

- 1. Single coat hooks HEWI No. 520.60.1 ABS plastic, color to be selected by Architect from manufacturer's full range.
- 2. Double coat hooks HEWI 520.50.2 ABS plastic, color to be selected by Architect from manufacturer's full range.
- 3. Ceiling hooks HEWI 513 ABS plastic, color to be selected by Architect from manufacturer's full range.
- L. Hangers: Captive and removable wood or metal; 17-inch.

2.3 COUNTERTOPS

A. Reference Section 12 36 00 Countertops.

2.4 FABRICATION, GENERAL

- A. Cabinet Construction: High-pressure plastic laminate surface finish; flush overlay type door/drawer style.
- B. Chemical Content: All materials used shall be relatively nontoxic when exposed to heat or flame.
- C. Wall Hung Units: When mounted on a wall and loaded with 25 psf on all horizontal surfaces, units shall resist a lateral force applied at the bottom of the cabinet parallel to the long dimension of the cabinet of 300 lbs without failure. Each wall hung unit shall safely support a uniform load of 600 lbs.

D. Storage units with or without doors shall be able to have shelves and/or vertical dividers rearranged within one or more units of same size without defacing interior of unit.

FABRICATION, CABINETS 2.5

A. Drawers:

- 1. Drawers: Full box body design with a separate front; body sides and ends minimum 5/8-inch medium density fiberboard with almond color melamine laminate faces and matching almond color PVC top edges; bottoms minimum 1/4-inch thick medium density fiberboard with almond color facing.
- Corner Joints: Interlocking dowel pin design, with 8mm diameter dowel pins inserted 2. into drawer ends and fitted into matching hole patterns in drawer sides. Bottoms to be let into grooves all four sides; all joints glued and bottoms shall have additional mechanical fasteners; drawers to operate on mechanical slides as separately described.
- Separate drawer front, surfaced and edges as described, attached to drawer body with no 3. less than 4 screws through front side.
- Solid Hinged Doors: 3/4-inch thick particle board core, balanced construction laminate faces. Surfacing, edging and hinges as separately described.
- C. Solid Sliding Doors: 3/4-inch thick particle board core, balanced construction laminate faces. Each door with 2 nylon rollers mounted in bottom of door panel, and with door operating in aluminum top and bottom tracks. Surfacing and edging as separately described.
- D. Sliding Display Doors: Constructed of 1/4-inch thick, distortion free glazing sheets. Outer edge to have full length aluminum pull channel for strength. Doors must be accurately sized for easy movement in upper and lower extruded aluminum guide channels.
- E. Adjustable Shelves: Shelves less than 36 inches in length shall be 3/4 inches thick. Shelves 36 inches long and over, and all adjustable shelves in wall cabinets and bookcases shall be 1 inch thick. Shelves shall be constructed of plywood with almond color melamine laminate surfaces. Leading edge of shelf finished with a high impact, rigid PVC extrusion, almond in color to match shelf surface and cabinet interior. Exposed surfaces of open shelving without doors shall be finished with plastic laminate.
- F. Frame Rails Between Drawers: Full cabinet length, 3/4 inches thick by 3-1/2 inches wide, pinned, and fastened into cabinet sides. Front leading edge to be edged as separately described.
- G. Tote Trays: High impact polystyrene with smooth edges. Provide each tray with a card holder. Suspend tote trays from rails securely attached to cabinet partitions and sides.

FABRICATION, FIXED CASEWORK (BASE, WALL, HUTCH, AND TALL UNITS)

- A. Corner Joints: Incorporate fluted hardwood dowel pin construction, factory glued and clamped under pressure to assure rigid loadbearing corner joints.
- B. Cabinet Ends: 3/4-inch-thick panels of balanced construction, precision bored for fluted hardwood dowel pins installed in horizontal cabinet members. Base and tall units with one piece end panels continuous to floor for added load capability. Unexposed ends with laminate backing sheet.
- C. Cabinet Bottoms and Tops: 3/4-inch-thick panels of balanced construction for base and tall units. Precision bore panels to receive fluted hardwood dowel pins inserted with glue. Dowel pins shall extend from the panel ends for joining into mating hole patterns in the cabinets' side panels.

- D. Wall Cabinets: Full 1-inch-thick panels of balanced construction, with the same fluted hardwood fluted dowel pin and glue joint construction as the base and tall cabinets.
- E. Kick Panels: 4-inch-high, set back from cabinets' front edge and mechanically fastened to cabinet bottom and ends, to be an integral part of cabinet structure.
- F. Back Panels: 3/8-inch-thick, set in 3/8 inch from rear panels of balanced construction surfaced as described.
- G. Finished exposed backs of fixed cabinets shall be 3/4-inch-thick panels of balanced construction surfaced as described.
- H. Hanging rails to be provided in wall cabinets in upper back corner for mounting units to walls.
- I. Cabinet Subbase:
 - 1. To be separate and continuous (no cabinet body sides-to-floor), water-resistant exterior grade plywood with concealed fastening to cabinet bottom.
 - 2. Ladder-type construction of front, back and intermediates to form a secure and level platform to which cabinets attach.

2.7 FABRICATION, MOBILE CASEWORK

- A. Corner Joints: Incorporate a rigid fluted hardwood dowel pin construction system, glued and clamped under pressure.
- B. Ends: 3/4-inch-thick panels of balanced construction precision bored for dowel pins installed in horizontal cabinet members.
- C. Mobile Cabinets: Provide with a double bottom and top frame panel design.
 - 1. Interior bottoms and tops, 3/4-inch-thick panels of balanced construction. The front leading edge of these panels built-up to 1-1/2 inch thick and edged with rigid PVC. Panels bored to receive fluted dowel pins with pins to be inserted with glue and join mating hole pattern in cabinet side panel.
 - 2. Exterior bottoms and tops, 3/4-inch thick panels of balanced construction. Panels to extend past all four sides of the unit and edged with high impact plastic extrusion to form a wrap-around bumper system to prevent damage during normal use. Bumper system shall be standard on all mobile units.
- D. Casters: Provide each mobile cabinet with four heavy duty 5-inch ball bearing swivel casters with a minimum wheel face of 1-1/4 inches, and 290-lb working load rating per caster. Provide two front casters with wheel lock. Attach each caster with four flat head bolts with lock nuts through bottom panels.
- E. Backs: 3/4-inch-thick panel of balanced construction and finished with exterior surfaces laminate. Backs tenoned into cabinet ends and grooved to accept interior top and bottom panels, and fastened with glue, screws, and corner brackets.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for, installation tolerances, and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Do not install casework units until painting and drywall work in the space has been completed and the space is dry.
- B. Install cabinets in such a way that relocation can be accomplished without marred end panels and use of special tools.
- C. Install cabinets under supervision of manufacturer's representative with factory-trained journeymen authorized by manufacturer.
- D. Install cabinets indicated on Drawings in correct locations.
- E. Erect casework straight, level and plumb and securely anchor in place; base cabinets installed on plywood ladder bases.
- F. Mount wall-hung cabinets on concealed 1-by-3 softwood hanging strips secured to wall with expansion or toggle bolts, minimum four per cabinet.
- G. Firmly anchor fixed cabinets and any required scribe moldings to walls and floors. Finish of scribe molding shall match cabinets.
- H. Furnish scribes 3/4 inch thick and filler pieces to fill spaces in material matching cabinet panels or frames, between units and between units and walls where open spaces occur.
- I. Patch surfaces damaged by installation to new condition or remove and install new material as approved.
- J. Rims of sinks specified in Division 15 shall be set in sealant to insure waterproof seal between rim and countertop.

3.3 CLEANING AND PROTECTION

- A. Leave finished work clean, free of scratches, dents, gouges, or other damage, with doors and drawers operating freely at time of final acceptance. Leave work area clean and free of debris.
- B. Protect materials and installed casework from damage by work of other trades.

END OF SECTION

SECTION 12 35 51 - MUSICAL INSTRUMENT STORAGE CABINETS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Musical instrument and uniform cabinet system.

1.2 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Design system of storage cabinets for uniforms (ventilated) and musical instruments which are chip- and abrasion-resistant under normal usage and will protect instruments and cases from damage under normal use.
 - 2. Design shelving to withstand continuous use without surface or front edge breakdown.
 - 3. Design cabinet panels with polyester laminate on both sides to provide modularity and/or relocation of any cabinet.

1.3 PERFORMANCE REQUIREMENTS

- A. Hanger rods shall support a minimum vertical load of 200 lbs applied anywhere.
- B. Full height doors shall support a minimum vertical live load of 315 lbs applied to outer edge.
- C. Compartment door hinges must be through-bolt construction to cabinet panels; other attachment will not be accepted.

1.4 SUBMITTALS

- A. Product Data: Applicable reference standards, performance data, and application recommendations and limitations, and finishes.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, and hardware.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material exposed to view.
- D. Samples for Verification: For the following materials, in sets showing full range of color, texture, and pattern variations expected:
 - 1. Plastic Laminate for Casework Finish: 8 by 10 inches.
 - 2. Hardware: One unit of each type of exposed hardware.
- E. Product Schedule: For musical instrument storage cabinets. Use same designations indicated on Drawings.
- F. Product Certificates: For each type of musical instrument storage cabinet, signed by product manufacturer certifying that products furnished comply with requirements.
- G. Maintenance Data: To include in maintenance manuals.
- H. Warranty: Special warranty specified in this Section.
- I. Submit certification of application of borate treatment to woodwork in contact with slab.
- J. LEED Submittals:
 - 1. Credit EQ 4.1: Manufacturers' product data for installation adhesives, including printed statement of VOC content.
 - 2. Credit EQ 4.4:

- a. Composite wood manufacturer's product data for each composite wood product used indicating that the bonding agent contains no urea formaldehyde.
- b. Adhesive manufacturer's product data for each adhesive used indicating that the adhesive contains no urea formaldehyde.
- 3. Credit MR 7: Certificates of chain-of-custody signed by manufacturers certifying that products specified to be made from certified wood were made from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria." Include evidence that mill is certified for chain-of-custody by an FSC-accredited certification body.
- 4. Credit MR 5: There is a goal to achieve credit for products and material regionally manufactured, extracted, harvested or recovered.
 - a. Include statement indicating cost and distance from manufacturer to Project for each regionally manufactured material.
 - b. Include statement indicating cost and distance from point of extraction, harvest, or recovery to Project for each raw material used in regionally manufactured materials.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of musical instrument storage cabinet manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain cabinets through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, dimensional requirements, and finish material of casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes, similar door and drawer configurations, same finish material, and complying with the Specifications may be considered. Refer to Division 1 Section "Product Requirements."
- D. Quality Standards: Unless otherwise indicated, comply with the following standards:
 - 1. ANSI/BHMA Standard A156.9, Grade 1.
 - 2 American Laminators Association Performance Standard ALA 1985
- E. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver musical instrument storage cabinets only after painting and similar operations that could damage, soil, or deteriorate cabinets have been completed in installation areas where cabinets must be stored in other than installation areas; store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.7 PROJECT CONDITIONS

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

- B. Field Measurements: Where musical instrument storage cabinets are indicated to fit to other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 - Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating musical instrument storage cabinets without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate layout and installation of blocking and reinforcement in partitions for support of cabinets.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of musical instrument storage cabinets that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Delamination of components or other failures of glue bond.
 - 2. Warping of components.
 - 3. Failure of operating hardware.
 - 4 Deterioration of finishes
- B. Warranty Period: Three years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Wenger Corporation (Basis-of-Design).
 - 2. Case Systems (modified for performance requirements).
 - 3. LSI Corporation of America, Inc. (modified for performance requirements).
 - 4. Melhart Music; www.melhartschoolequipment.com.

2.2 MATERIALS

- A. Wood Products: Comply with the following:
 - 1. Hardboard: AHA A135.4.
 - 2. Particleboard: ANSI A208.1, Type M-3 Exterior Glue complying with requirements in ANSI A208.1, Grade M-3.
 - 3. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no added urea formaldehyde.
- B. Thermoset Decorative Panels: Particleboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
 - 1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semiexposed edges.
- C. High-Pressure Decorative Laminate: NEMA LD 3.
- D. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

- 1. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: 30 g/L.
 - b. Contact Adhesive: 250 g/L.
- E. Local Materials: Provide materials manufactured and of raw materials within 500 miles of Project Site. and give preference to with recycled content materials.
- F. Give preference to products with recycled content, agrifiber products or FSC certified sustainably harvested wood products.

2.3 MATERIALS, GENERAL

- A. Cabinet Wall Panels: 3/4-inch-thick industrial (cabinet) grade particleboard, minimum 48 pcf with thermoset polyester laminate on both sides for totally finished construction.
- B. Cabinet Shelving:
 - 1. Cabinets up to 27 Inches Wide: One-piece, high molecular, blow-molded polyethylene with radiused front edge. Mount to cabinet walls with one-piece molded rigid ST nylon clip. Shelf is replaceable.
 - 2. Cabinets over 27 Inches Wide: One-piece, high molecular-formed polyethylene with radiused front edge and 3/16-inch wall thickness. Ribbed for structural integrity. Supported by four 1-by 1-1/2 inch steel tubes with 0.060-inch-thick wall thickness and 0.075-inch-thick plates welded to ends.
- C. Wood Doors: Same construction as cabinet walls.
 - 1. Finish: Maple.
 - a. Available Product: Timber Products; Plank Maple Birch.
 - 2. Hardware:
 - a. Hinges: 5-knuckle, institutional type hinge, capable of supporting 315 lbs. dynamic vertical load. Hinge pin shall be 2-3/4 inches long. Fastened to cabinet and door with through-bolt construction. Provide two hinges on compartment doors; four hinges on full height doors.
 - 1) Finish: Powder coating.
 - b. Lock: Locking slide-bolt designed for padlocks, with strike plate; 0.105-inch-thick steel. Provide clear plastic label holder for identification card insert.
 - 1) Finish: Powder coating.
- D. Grille Doors: Welded steel grille construction with powder coat finish. Welds at tee-joints shall be 360 degrees.
 - 1. Hardware:
 - a. Hinges: 5-knuckle, institutional type hinge, capable of supporting 315 lbs. dynamic vertical load. Hinge pin shall be 2-3/4 inches long. Weld to door frame in five places. Fasten to cabinet and door with through-bolt construction. Provide two hinges on compartment doors; four hinges on full height doors.
 - b. Finish: Powder coating.
- E. Edging: Heat bonded 3 mm beveled PVC edge-banding.
- F. Finish Hardware:
 - 1. Joinery Hardware: 2-inch, 1/4-20 panel connectors with 15 mm head diameter, and steel thread inserts.
 - 2. Cabinet Levelers: Four leveling glides within minimum 3/8-inch diameter threaded rod in steel corner brackets, six glides for cabinets with divider panels.

G. Cabinet Back Panel:

1. Cabinet Back: 1/4-inch-thick prefinished hardboard. Match color of interior side of top panels.

2.4 ACCESSORIES

- A. Vertical Closure Kit: Provide visual closure between wall and cabinet. Constructed of 3/4-inch-thick thermoset polyester composite wood to match cabinet side panels for 3/4 inch to 30 inch wide openings.
- B. Horizontal Closure Kit: Provide visual closure between top of cabinet and soffit. Constructed of 3/4-inch-thick thermoset polyester composite wood to match cabinet side panels for 3/4 inch to 30 inch high openings.
- C. Top Back Filler Kit: Provide visual closure between back wall and top panel of cabinet. Constructed of 3/4-inch-thick thermoset polyester composite wood to match cabinet top panels for 10-inch and 20-inch deep openings.
- D. Finished Back Panel: Provide panel to attach to cabinet back that is exposed. Constructed of 1/2-inch-thick thermoset polyester composite wood to match cabinet.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for, installation tolerances, location of reinforcements, and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CABINET ERECTION

- A. Install cabinet system in accordance with manufacturer's instructions.
- B. Install cabinet system with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.
- C. Install cabinet system without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.
- D. Install cabinet system level and plumb to a tolerance of 1/8 inch in 8 feet.
- E. Fasten cabinets to adjacent units and to backing.
 - 1. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
 - 2. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c., with toggle bolts through metal backing behind gypsum board.

3.3 TERMITE TREATMENT

A. Field-apply borate surface treatment to lower 12 inches of woodwork in contact with slab on grade.

3.4 ADJUSTING AND CLEANING

A. Adjust cabinets and hardware so doors are centered in openings and operate smoothly without warp or bind Lubricate operating hardware as recommended by manufacturer.

B. Clean cabinets on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas to match original factory-finish as approved by Architect.

3.5 PROTECTION

A. Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION

SECTION 12 35 53 - WOOD LABORATORY CASEWORK

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Wood laboratory casework.
 - 2. Laboratory countertops.
 - 3. Shelves.
 - 4. Laboratory sinks and troughs.
 - 5. Laboratory fixtures.
 - 6. Accessories.
- B. Wood laboratory casework and equipment as specified herein and as scheduled, and noted on the drawings is to be furnished, delivered, and installed in the location required by the drawings, and left ready for connection of plumbing fixtures and electrical fixtures by others.
- C. Casework, equipment, service fixtures and related work shall include:
 - 1. Furnishing, delivering to the building, uncrating, setting in place and leveling all casework and equipment listed in this specification or equipment schedule and/or shown on the drawings.
 - 2. Furnishing plumbing fixtures and fittings as defined in this specification, complete with tank nipples and lock nuts for mounting fixtures and fittings to tops or curbs. Fixtures shall be furnished assembled, in properly marked cartons for installation by casework contractor. Final hook up or connection to services shall be by others. Nipples for hot and cold water shall be brass.
 - 3. Furnishing electrical service fixtures directly attached to the casework or equipment as called for in this specification, equipment list and/or shown on the drawings. Fixtures shall be furnished assembled in properly marked cartons for installation and final hook up or connection by others. Rough in boxes for duplex receptacles and data drops located in cabinetry or aprons shall be installed at the factory by the equipment manufacturer.
 - 4. Furnishing of sink bowls and cupsinks, complete with required sink supports, overflows, and outlets with plugs and strainers, as called for in this specification, equipment schedule and/or shown on the drawings. Units shall be assembled and installed by casework contractor. Separate outlets shall not exceed 4" in length. Outlets shall be furnished without couplings required to connect to the drain piping system. Installation of the outlets shall be by casework supplier.
 - 5. Furnish along with specified fume hoods all service fixtures, fittings, remote control rods, escutcheon plates, valve handles and nipples. Service fixtures shall be furnished attached to superstructure and pre-piped below countertop for final connection by others.
 - 6. Furnishing and installing countertops as shown on the drawings, of the size and shape required on all laboratory casework.
 - 7. Remove all debris, dirt and rubbish accumulated as a result of installation of this equipment, leaving premises broom clean and orderly.
 - 8. Final Adjustment: It is recognized that wood doors and drawers will swell and stick because of unusually high ambient moisture in new construction work. Casework installer shall during the first year return after final inspection to make any final adjustments to drawers and doors to eliminate sticking or other problems. Any doors or drawers, which cannot be corrected shall be replaced.
- D. Related Sections include the following:

- 1. Division 6 Section "Rough Carpentry" for wood blocking for anchoring laboratory casework.
- 2. Division 9 Section "Gypsum Board Assemblies" for reinforcements in metal-framed gypsum board partitions for anchoring laboratory casework.
- 3. Division 9 Section "Resilient Flooring" for resilient base applied to wood laboratory casework.
- 4. Division 11 Section "Laboratory Fume Hoods" for fume hoods, including base cabinets and countertops under fume hoods.
- 5. Division 25 Sections for sinks and fittings in countertops.
- 6. Division 26 Sections for electrical fittings and outlets.

1.2 DEFINITIONS

- A. Exposed Portions of Casework: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and visible surfaces in open cabinets or behind glass doors.
 - 1. Ends of cabinets indicated to be installed directly against and completely concealed by walls or other cabinets after installation shall not be considered exposed.
- B. Semiexposed Portions of Casework: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches or more above floor are defined as semiexposed.
- C. Concealed portions of casework include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include independent certification that applied finish complies with specified chemical and physical resistance requirements.
- B. Shop Drawings: For wood laboratory casework. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Indicate locations of blocking and reinforcements required for installing laboratory casework.
 - 2. Include details of exposed conduits, if required, for service fittings.
 - 3. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.
 - 4. Include coordinated dimensions for laboratory equipment and service fittings specified in other Sections.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework finishes and countertops with requirements specified for chemical and physical resistance.
- D. Maintenance Data: For laboratory casework to include in maintenance manuals.
- E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain laboratory casework, including countertops, sinks, service fittings, and accessories, through one source from a single manufacturer.
 - 1. Obtain through same source from same manufacturer as fume hoods specified in Division 11 Section "Laboratory Fume Hoods."

- B. Product Designations: Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Unless modified by notation on Drawings, or otherwise specified, catalog description for designated product constitutes requirements for each product and establishes a standard of design and quality for materials, construction and workmanship. Other acceptable manufacturers' laboratory casework of similar sizes, similar door and drawer configurations, and complying with the Specifications will be accepted.
- C. Product Standard: Comply with SEFA 8, "Laboratory Furniture--Casework, Shelving and Tables--Recommended Practices."
- D. Flammable Liquid Storage: Where cabinets are indicated for solvent or flammable liquid storage, provide units that are listed and labeled as complying with requirements of NFPA 30 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Accessibility Requirements: In addition to local governing regulations, comply with "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Administrative Requirements."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver laboratory casework only after wet operations in areas where casework is to be installed are completed.
- B. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.
- C. Store completed laboratory casework in a ventilated place, protected from the weather, with relative humidity of 50 percent or less at 70 deg F.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install wood laboratory casework until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of wood laboratory casework.
- B. Coordinate installation of wood laboratory casework with installation of fume hoods and other laboratory equipment.

1.8 WARRANTY

- A. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of laboratory casework systems due to defects of material and workmanship. Warranty shall not cover damage caused by misuse or negligence.
 - 1. Warranty Period: 3 years from date of Substantial Completion.

1.9 EXTRA MATERIALS

A. Furnish complete touchup kit for each type and color of wood laboratory casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Wood Laboratory Casework:
 - a. Leonard Peterson (Basis-of-Design).
 - b. Sheldon Laboratory Systems.
 - c. Kewaunee Scientific Corporation, Laboratory Products Group.
 - 2. Epoxy Countertops, Sinks and Troughs:
 - a. Durcon Company, Inc. (The).
 - b. Epoxyn Products.
 - c. Laboratory Tops, Inc.
 - d. Prime Industries, Inc.

2.2 CABINET MATERIALS

A. General:

- 1. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- 2. Hardwood Plywood: HPVA HP-1 made with adhesive containing no urea formaldehyde, either veneer core or particle core, unless otherwise indicated.
- 3. Edgebanding for Wood-Veneered Construction: Minimum 1/8-inch-thick, solid wood of same species as face veneer; laminating glue shall contain no urea-formaldehyde.

B. Exposed Materials:

- 1. General: Provide materials that are selected and arranged for compatible grain and color. Do not use materials adjacent to one another that are noticeably dissimilar in color, grain, figure, or natural character markings.
- 2. Wood Species and Veneer Cut: Maple, plain sawn.
- 3. Stain Colors and Finishes: As selected by Architect from manufacturer's full range.
- 4. Solid Wood: Clear hardwood lumber.
- 5. Plywood: Urea-formaldehyde free hardwood plywood; Grade A exposed faces at least 1/50 inch thick, Grade J crossbands, and backs of same species as faces.

C. Semiexposed Materials:

- 1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects, of any species similar in color and grain to exposed solid wood.
- 2. Plywood: Urea-formaldehyde free hardwood plywood of any species similar in color and grain to exposed plywood. Grade B faces, Grade J crossbands, and backs of same species as faces. Semiexposed backs of plywood with exposed faces shall be same species as faces.

D. Concealed Materials:

1. Solid Wood: Any hardwood or softwood species, with no defects affecting strength or utility.

- 2. Plywood: Urea-formaldehyde free hardwood plywood. Concealed backs of plywood with exposed or semiexposed faces shall be same species as faces.
- 3. Particleboard: ANSI A208.1, Grade M-3 Exterior Glue complying with requirements in ANSI A208.1, Grade M-3.
- 4. Hardboard: AHA A135.4, Class 1 tempered.
- E. Glass for Glazed Doors: Clear tempered glass complying with ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; not less than 5.5 mm thick.

2.3 CABINET DESIGN

- A. As indicated by scheduled product listed on the Drawings.
- B. Grain Direction: Vertical on doors, horizontal on drawer fronts.

2.4 CABINET FABRICATION

- A. Construction: Provide wood-faced laboratory casework of the following minimum construction:
 - 1. Bottoms and Ends of Cabinets, Shelves, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch-thick plywood.
 - 2. Base Cabinet Top Frames: 3/4-by-2-inch solid wood with mortise and tenon or doweled connections, glued with urea-formaldehyde free glue and pinned or screwed.
 - 3. Backs of Cabinets: 3/4-inch- thick plywood where exposed, 1/4-inch- thick hardboard dadoed into sides, bottoms, and tops where not exposed.
 - 4. Security Panels: 1/4-inch-thick hardboard panels between drawers and between drawers and doors when base cabinet locks are keyed differently.
 - 5. Drawer Fronts: 3/4-inch-thick plywood or solid hardwood.
 - 6. Drawer Sides and Backs: 1/2-inch- thick solid wood or plywood, with urea-formaldehyde free glued dovetail or multiple-dowel joints.
 - 7. Drawer Bottoms: 1/4-inch- thick plywood glued and dadoed into front, back, and sides of drawers. Use 1/2-inch- thick material for drawers more than 24 inches wide.
 - 8. Doors 48 Inches or Less in Height: 3/4 inch thick, with particleboard or medium-density fiberboard cores, solid hardwood stiles and rails, and hardwood face veneers and crossbands.
 - 9. Doors More Than 48 Inches in Height: 1-1/8 inches thick, with honeycomb cores, solid hardwood stiles and rails, and veneer plywood on both sides.
 - 10. Stiles and Rails of Glazed Doors: 3/4-inch-thick solid hardwood.
- B. Leg Shoes: Vinyl or rubber, black, open-bottom type.
 - 1. Provide minimum 1-1/2-inch-diameter, nonmarring floor glides with minimum 5/8-inch height adjustment capability, for open-leg tables.
- C. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinet fronts.
- D. Accessibility Requirements: Modify cabinets where indicated, as required to comply with the "Americans with Disabilities Act (ADA)."

2.5 WOOD FINISH

A. Preparation: Sand lumber and plywood for laboratory casework construction before assembling. Sand edges of doors, drawer fronts, and molded shapes with profile-edge sander. Sand casework after assembling for uniform smoothness at least equivalent to that produced by 220 grit sanding and without machine marks, cross sanding, or other surface blemishes.

- B. Staining: Remove fibers and dust and apply stain to exposed and semiexposed surfaces as necessary to match approved Samples. Apply stain in a manner that will produce a consistent appearance. Apply wash-coat sealer before applying stain to closed-grain wood species.
- C. Chemical-Resistant Finish: Apply laboratory casework manufacturer's standard three-coat, chemical-resistant, transparent finish consisting of sealer and catalyzed topcoat(s). Sand and wipe clean between coats. Topcoat(s) may be omitted on concealed surfaces.
 - 1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions

2.6 CABINET HARDWARE

- A. General: Provide laboratory casework manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless-steel, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors 48 inches or less in height; 3 for doors more than 48 inches in height.
- C. Pulls: Solid aluminum, stainless steel, or chrome-plated brass; fastened from back with two screws. For sliding doors, provide stainless-steel or chrome-plated recessed flush pulls. Provide 2 pulls for drawers more than 24 inches in width.
- D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches in height.
- E. Drawer Slides: Powder-coated, full-extension, self-closing, heavy-duty drawer slides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; and complying with BHMA A156.9, Type B05091, and rated for 100 lbf.
- F. Label Holders: Stainless steel, aluminum, or chrome plated; sized to receive standard label cards approximately 1 by 2 inches, attached with screws or rivets. Provide on all drawers.
- G. Locks: Cam type with 5-pin tumbler, brass with chrome-plated finish; complying with BHMA A156.11, Type E07281.
 - 1. Provide minimum of two keys per lock and two master keys.
 - 2. Provide on all drawers and doors.
- H. Adjustable Shelf Supports: Pin-type, corrosion-resistant coated shelf support clips for mounting on interior of cabinet work, to retain shelves from accidental removal. Shelves shall be adjustable on 2-inch centers. Surface mounted metal support strips and clips subject to corrosion are not acceptable.

2.7 COUNTERTOPS, TROUGHS, AND SINKS

- A. Countertops, General: Provide units with smooth surfaces in uniform plane free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch, with continuous drip groove on underside 1/2 inch from edge.
- B. Sinks, General: Provide sizes indicated or laboratory casework manufacturer's closest standard size of equal or greater volume, as approved by Architect.
 - 1. Outlets: Provide with strainers and tailpieces, NPS 1-1/2, unless otherwise indicated.
 - 2. Overflows: For each sink except cup sinks, provide overflow of standard beehive or open-top design with separate strainer. Height 2 inches less than sink depth. Provide in same material as strainer.

- C. Epoxy Countertops, Troughs, and Sinks: Factory molded of modified epoxy-resin formulation with smooth, nonspecular finish.
 - 1. Physical Properties:
 - a. Flexural Strength: Not less than 10,000 psi.
 - b. Modulus of Elasticity: Not less than 2,000,000 psi.
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.02 percent.
 - e. Heat Distortion Point: Not less than 260 deg F.
 - 2. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
 - b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
 - 3. Color: Black.
 - 4. Countertop Fabrication: Fabricate with factory cutouts for sinks and with butt joints assembled with epoxy adhesive and prefitted, concealed metal splines.
 - a. Countertop Configuration: Flat, 1 inch thick, with rounded edge and corners, and with drip groove and integral coved backsplash.
 - b. Countertop Construction: Uniform throughout full thickness.
 - 5. Table Top Configuration: Raised (marine) edge, 1-1/4 inch thick at raised edge, with rounded edge and corners, and with integral coved backsplash.
 - 6. Sink Fabrication: Molded in 1 piece with smooth surfaces, coved corners, and bottom sloped to outlet; 1/2-inch minimum thickness.
 - a. Provide with polypropylene strainers and tailpieces.
- D. Cup Sinks: Material and size as indicated.
 - 1. Provide epoxy cup sinks with polypropylene strainers and integral tailpieces.
- E. Troughs: Epoxy. Comply with requirements for materials and construction as specified for countertops and sinks. Pitch to drains not less than 1/8 inch/foot.
 - 1. Outlets: Except where troughs empty into sinks, provide NPS 1-1/2 outlets with strainers and tailpieces.
 - 2. Provide epoxy troughs with polypropylene strainers and tailpieces.

2.8 ACCESSORIES

- A. Reagent Shelves: Provide as indicated, fabricated from same material as adjacent countertop, unless otherwise indicated.
- B. Pegboards: Polypropylene, epoxy, or phenolic-composite pegboards with removable polypropylene pegs and stainless-steel drip troughs with drain outlet.

2.9 PLUMBING AND ELECTRICAL FIXTURES

- A. Plumbing fixtures shall be furnished in laboratory grade chrome plated brass as manufactured by Water Saver Faucet Company, The Chicago Faucet Company, or T & S Brass Works.
 - 1. Fixtures provided with brass tank nipples complete with locknuts and washers for attachment to countertops.
 - 2. Water fixtures to be provided with adjustable volume control (Water Saver BNV200AC or equal) and with atmospheric inline vacuum breakers.
 - 3. Fixtures supplied assembled (tank nipples loose).

- B. Safety showers and eyewashes shall be provided in materials as standard with catalog number specified. Safety showers and eyewashes shall be furnished assembled for final installation or mounting by others.
- C. Pedestal electric boxes, cast aluminum finished in black textured coating furnished with tank nipples and locknuts for attachment to countertops.
 - 1. Electrical boxes mounted in table or cabinet aprons shall be steel.
 - 2. Electric receptacles, switches, etc., shall be specification grade 20 amp and UL approved. Receptacles located within 6'0" of sinks to be G.F.I. type.
 - 3. Cover plates for receptacles shall be stainless steel.
- D. Mounting of electric boxes in table aprons or cabinet units shall be by Casework Manufacturer

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of wood laboratory casework.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

- A. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Adjust top rails and subtops within 1/16 inch of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches o.c. Fasten adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
 - 1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches o.c. and at sides of cabinets with not less than 2 fasteners per side.
- C. Wall Cabinets: Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches o.c. Align similar adjoining doors to a tolerance of 1/16 inch.
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- E. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

- A. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.
- B. Field Jointing: Where possible, make in the same manner as shop jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop.
 - 1. Use concealed clamping devices for field joints in plastic-laminate countertops. Locate clamping devices within 6 inches of front and back edges and at intervals not exceeding

24 inches. Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.

C. Fastening:

- 1. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches o.c.
- 2. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.
- D. Provide required holes and cutouts for service fittings.
- E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.
- F. Provide scribe moldings for closures at junctures of countertop, curb, and splash, with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.
- G. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 INSTALLATION OF SINKS

A. Underside Installation of Epoxy Sinks: Use laboratory casework manufacturer's recommended adjustable support system for table- and cabinet-type installations. Set top edge of sink unit in sink and countertop manufacturers' recommended chemical-resistant sealing compound or adhesive and firmly secure to produce a tight and fully leakproof joint. Adjust sink and securely support to prevent movement. Remove excess sealant while still wet and finish joint for neat appearance.

3.5 INSTALLATION OF ACCESSORIES

- A. Install accessories according to Shop Drawings and manufacturer's written instructions.
- B. Securely fasten pegboards to partition framing, wood blocking, or reinforcements in partitions.

3.6 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- B. Protect countertop surfaces during construction with 6-mil plastic or other suitable water-resistant covering. Tape to underside of countertop at minimum of 48 inches o.c.

END OF SECTION

SECTION 12 36 00 - COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Countertops for architectural cabinet work.
- B. Wall-hung counters and vanity tops.

1.2 RELATED REQUIREMENTS

A. Section 06 41 00 - Architectural Wood Casework.

1.3 REFERENCE STANDARDS

- A. ANSI A208.1 American National Standard for Particleboard; 2009.
- B. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- C. AWI/AWMAC/WI (AWS) Architectural Woodwork Standards; 2014.
- D. NEMA LD 3 High-Pressure Decorative Laminates; 2005.
- E. PS 1 Structural Plywood; 2009.

1.4 SUBMITTALS

- A. See Section 01 30 00 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. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- F. LEED Report: Submit for wood products made from sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, and locally-sourced wood, as specified in Section 01 35 15.
- G. LEED Submittals: Provide documentation of VOC content in g/L for adhesives applied within the building waterproofing envelope; document no added urea formaldehyde for composite wood, agrifiber products and laminating adhesives.
- H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Same fabricator as for cabinets on which tops are to be installed.
- B. Installer Qualifications: Fabricator.

1.6 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.

1.7 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

2.1 COUNTERTOP ASSEMBLIES

- A. Plastic Laminate Countertops: High pressure decorative laminate sheet bonded to substrate.
 - 1. Laminate Sheet, Unless Otherwise Indicated: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
 - a. Surface Burning Characteristics: Flame spread 25, maximum; smoke developed 450, maximum; when tested in accordance with ASTM E84.
 - b. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
 - c. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1) As selected by Architect from laminate manufacturer's full range in solid colors, wood grains, and patterns, including stone, marble and leathers.
 - 2) Ten different colors may be selected by Architect for this Project.
 - d. Manufacturers:
 - 1) Formica Corporation: www.formica.com.
 - 2) Lamin-Art, Inc: www.laminart.com.
 - 3) Panolam Industries International, Inc\Nevamar: www.nevamar.com.
 - 4) Panolam Industries International, Inc\Pionite: www.pionitelaminates.com.
 - 5) Wilsonart, LLC: www.wilsonart.com.
 - 2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with 3mm polyvinylchloride (PVC), machine applied with hot melt adhesive, inside/outside length radiused, corner radiused and buffed.
 - a. Color selection for PVC edging will be made at a later date; Architect reserves the right to select colors manufactured and offered by Woodtape Edge Banding (at no additional cost to the Owner), when a standard selection offered by the casework manufacturer does not provide a suitable color in the Architect's opinion.
 - 3. Back and End Splashes: Same material, same construction.
 - 4. Fabricate in accordance with AWI/AWMAC/WI (AWS), Section 11 Countertops, Premium Grade.

B Solid Surface Materials:

- 1. Location: Where solid surface materials are noted on the drawings.
- 2. Basis-of-Design: Durat by Renewed Materials LLC; www.alkemi.com.
 - a. Subject to matching Basis-of-Design colors, other approved manufacturers are Corian and Wilsonart Solid Surfaces.
- 3. Material:
 - a. Recycled material composed of soft alloy aluminum scrap flake fillers.
 - b. Recycled Content: Minimum 30 percent post-industrial scrap.

- 4. Honed texture.
- 5. Colors: As selected by Architect from manufacturers full range.
- 6. Edges: Thickened eased and polished.

2.2 ACCESSORY MATERIALS

- A. Wood-Based Components:
 - 1. Wood fabricated from old growth timber is not permitted.
 - 2. Composite Wood and Agrifiber Products: No added urea formaldehyde.
- B. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- C. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 47 pcf minimum density; minimum 3/4 inch thick; join lengths using metal splines.
- D. Backer Sheet: Provide substrate with laminate backer sheet.
- E. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

2.3 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.
- C. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Seal joint between back/end splashes and vertical surfaces.

3.3 CLEANING AND PROTECTION

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

END OF SECTION

SECTION 12 48 13 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roll-up mats.
- B. Recessed mat frames.
- C. Entrance Carpet Mats.

1.2 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating properties of walk-off surface, component dimensions, recessed frame characteristics and profiles, and finishes.
- C. Shop Drawings: Indicate dimensions, details for recessed frame, and divisions between mat sections.
 - 1. For recessed frames located within a dimensionally restricted area, show dimensions of space within which the frame will be installed.
- D. Samples for Initial Selection: For each type of product indicated.
- E. LEED Submittals:
 - 1. Credit MR 4: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - a. Contributions to this Credit include recycled content of aluminum.
 - 2. Coordinate with Construction Waste Management requirements.
 - 3. Coordinate with Construction Indoor Air Quality management Plan.
- F. LEED Submittal: Product data for Credit IEQ 4.2: For paints and coatings applied within the building waterproofing envelope, documentation including printed statement of VOC contents in g/L.
- G. Maintenance Data: Include cleaning instructions and stain removal procedures.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain floor mats and frames through one source from a single manufacturer.
- B. Accessibility Requirements: Provide installed floor mats that comply with most stringent requirements of Section 4.5 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)" and Sections 302 and 303 in ICC A117.1.

1.4 PROJECT CONDITIONS

A. Field Measurements: Indicate measurements on Shop Drawings.

1.5 COORDINATION

A. Coordinate size and location of recesses in concrete with installation of finish floors to receive floor mats and frames.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Floor Mats:
 - 1. Basis-of-Design: CS Group.
 - 2. American Floor Products Company, Inc: www.afco-usa.com.
 - 3. R.C. Musson Rubber Co: www.mussonrubber.com.
 - 4. Pawling Corporation: www.pawling.com.

2.2 MATS

- A. Locations: Vesitbule V100 and C15A.
- B. Roll-Up, Aluminum-Rail Hinged Mats: Extruded-aluminum tread rails 1-1/2 inches wide by 7/16 inches thick, sitting on continuous vinyl cushions.
 - 1. Tread Inserts: 32-oz./sq. yd. weight, fusion-bonded solution-dyed polypropylene carpet.
 - 2. Rail Color: Clear.
 - 3. Hinges: Aluminum.
 - 4. Mat Size: As indicated.
 - 5. Products:
 - a. Basis-of-Design: C/S Group; Product Pedimat M1.
 - b. American Floor Products Company, Inc.; Stratoflex III Foot Grid System.
 - c. Musson, R. C. Rubber Co.; Product EM-800.
 - d. Pawling Corporation; Architectural Products Division; Product EM-800 Rol-Dek.
 - 6. Recessed Frame:
 - a. Basis-of-Design: C/S Pedimat 3/4" level base (LB).
 - b. Extruded Aluminum: ASTM B 221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52.
 - c. Color: Clear anodized.

2.3 ENTRANCE CARPET MATS

- A. Location: Receiving 1408X.
- B. Basis-of-Design: DesignStep Carpet Mat, Power Point PWPT by C/S Group.
 - 1. Entrance carpet shall be manufactured from 100% UV resistant polypropylene fibers with a face weight of 44 oz. Overall depth ½" (.47", 11.94mm). Supplied with all weather non-skid rubber backing. Choose from 6' 6" (2006.6mm) or
 - 2. Size: 20 x 20 inch square.
 - 3. Installation Method: Adhered.
 - 4. Color: As selected by Architect from manufacturers full range.

2.4 CONCRETE FILL AND GROUT MATERIALS

A. Provide concrete grout and fill equivalent in strength to cast-in-place concrete slabs for recessed mats and frames. Use aggregate no larger than one-third fill thickness.

2.5 FABRICATION

- A. Construct recessed mat frames square, tight joints at corners, rigid. Coat surfaces with protective coating where in contact with cementitious materials.
- B. Fabricate mats in single unit sizes; fabricate multiple mats where indicated. Do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal

traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and floor conditions for compliance with requirements for location, sizes, minimum recess depth, and other conditions affecting installation of floor mats and frames.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Mats: Verify size of floor recess before fabricating mats.
- B. Vacuum clean floor.

3.3 INSTALLATION

- A. Install frames to achieve flush plane with finished floor surface and comply with manufacturer's written instructions.
- B. Coordinate top of mat surfaces with bottom of doors that swing across mats to provide clearance between door and mat.
- C. Install walk-off surface in floor recess flush with finish floor after cleaning of finish flooring.
 - 1. Install necessary shims, spacers, and anchorages for proper location and secure attachment of frames.
 - 2. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

3.4 PROTECTION

A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION

SECTION 12 66 13 - TELESCOPING STANDS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes electrically operated wall-attached telescoping stands.
- B. Electric motor operators, controls, and internal wiring.

1.2 DESIGN REQUIREMENTS

- A. Telescopic gymnasium seating will be designed to support a vertical live load of 100 pounds per square foot, but not less than 120 pounds per lineal foot on both seat boards and footboards; seating shall also be designed to carry a horizontal sway force of 24 pounds per lineal foot parallel to the seating and 10 pounds per lineal foot perpendicular to the seating.
- B. No section length greater than 25'-6" for wall attached units is permitted and 19'-6" for portable units.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for telescoping stands.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Wiring Diagrams: Show locations of motors, electrical wiring, and rough-in connections.
- C. Samples for Initial Selection: For each type of exposed finish required.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1. Decking: 3-inch- square samples of finished material.
 - 2. Metal Components: 3-inch- square sample of each color and finish indicated.
 - 3. Seating: 3-inch-square sample of each seating material and finish indicated.
- E. Qualification Data: For Installer.
- F. LEED Report: Accurately document the use of recycled materials and local/regional materials.
- G. Operation and Maintenance Data: For telescoping stands to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Manufacturer's Engineering Responsibility: Preparation of data for telescoping stands, including Shop Drawings, and comprehensive engineering analysis by a qualified professional engineer.
- C. Safety Standard: Provide telescoping stands that comply with requirements in NFPA 102.
- D. Welding: Qualify procedures and personnel according to AWS D1.1 "Structural Welding Code Steel" and AWS D1.3 "Structural Welding Code Sheet Steel."
- E. Accessibility Requirements: Provide telescoping stands that comply with requirements in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)".

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, columns, and other construction that will interface with telescoping stands by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 EXTRA MATERIALS

A. Provide eight extra seats and front panels.

1.7 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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Hussey Seating Company.
 - 2. Interkal LLC.
 - 3. Irwin Folding Bleacher Company.
- B. Design to incorporate permanently fixed handicapped locations with front rail for spectator safety.

2.2 MATERIALS

- A. Wood:
 - 1. Plywood: APA grade trademarked, DOC PS 1.
- B. Steel:
 - 1. Structural Steel Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coating designation.
 - 3. Uncoated Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold-rolled commercial steel), or ASTM A 1011/A 1011M, Designation CS (hot-rolled commercial steel).
 - 4. Tubing: ASTM A 500, cold formed; ASTM A 501, hot formed; or ASTM A 513, mechanical.
- C. Extruded Aluminum: ASTM B 221, alloy as standard for manufacturer.
- D. Polyethylene Plastic: High-density polyethylene; molded, color-pigmented, textured, impact-resistant, structural formulation.

2.3 TELESCOPING STANDS

A. Description: Operable systems of multiple-tiered seating on interconnected folding platforms that close, without being dismantled, into a nested stack for storing or moving. Stand units permit opening and closing of adjacent rows, allow individual and collective rows to be locked open for use, and close with vertical faces of upper skirts on the same vertical plane.

- B. Wall-Attached.
- C. Operation:
 - 1. Electrically operated by pendant control.
- D. Main Gymnasium 4 Banks:
 - 1. Depth per Row: (measured horizontally from front edge of one seaboard to front edge of the next seaboard) 26".
 - 2 Tiers:
 - a. As indicated on the drawings.
 - 3. Net Capacity:
 - a. As indicated on the drawings.
 - 4. Row Rise: 16 inches.
 - 5. Aisle Width: As indicated on the drawings.
- E. Bench Seats and Skirts:
 - 1. Material: Molded polyethylene plastic with contour seat surface.
 - a. Colors: As selected by Architect from manufacturer's standard.
 - 2. Bench Modules: 18 inches long unitized, interlocking, engineered, high density injection molded polyethylene modules providing scuff-resistant textured 10 inch wide anatomically contoured seat surface, with face designed to accept seat number plates. Seat and face shall incorporate a 2 inch minimum interlock.
 - 3. Profile: Designed with internal reinforcement ribs and cantilevered to the rear to provide not less than 3 inches smooth toe space beneath the seat.
 - 4. End Caps:
 - a. Each end of row shall be enclosed with matching end caps.
 - b. End caps shall be designed with concealed attachment and provide indent for row letters.
 - c. Color to match seat top.
 - 5. Fixed ADA spaces with front rail.
- F. Deck: Plywood.
 - 1. Finish: Two coats of polyurethane to provide a clear transparent finish.
- G. Risers: Steel sheet with manufacturer's standard rust-inhibiting coating or hot-dip galvanized finish.
- H. Rails: Structural steel, finished with manufacturer's standard powder coat system.
 - 1. Color: To match seats, no exceptions.
- I. Understructure: Structural steel.
 - 1. Finish: Manufacturer's standard rust-inhibiting finish.
 - 2. Color: Manufacturer's standard.
- J. Support Column Wheels: Nonmarring, soft, rubber-face wheel assembly under each support column.
 - 1. Include wheels of size, number, and design required to support stands and operate smoothly without damaging the flooring surface, as standard by manufacturer.
- K. Fasteners: Vibration proof, in manufacturer's standard size and material.
- L. Motor Operation: Manufacturer's standard drive mechanism, using motor adequately sized for the purpose.
 - 1. Provide UL listed electrical components and wiring.
 - 2. Controls: Start, Stop, Forward, and Reverse in a single control unit.

- 3. Control Station: Removable plug-in low-voltage pendant station, with first-row plug-in location for each motor.
- 4. Limit Switches: Automatically stop operation when unit has reached fully open or fully closed position.
- 5. Provide all wiring internal to bleacher units, to junction box located where indicated; ensure that wiring is not energized except during operation.
- 6. Electrical Characteristics: 120V, single phase, 60 Hz.
- 7. Provide access to motor from front side of bleachers; a hinged front skirt or hinged section at least 30 inches wide is acceptable.

M. Accessories:

- 1. Slip-resistant, abrasive tread surfaces at vertical aisles.
- 2. Intermediate, transitional (main gym bleachers only) and front aisle steps, fully enclosed, at each vertical aisle.
- 3. Store-in-place Aisle Handrails: Provide single pedestal mount handrails 34 inches high with terminating mid-rail.
 - a. Nose-mounted.
 - b. Closed-loop handrail.
- 4. End rails (guards) that are telescoping and self-storing.
- 5. Rear fillers including supports for closing openings between top row and rear wall of adjoining construction.
- 6. Front rails and front panels at ADA locations, rail finish to match other rails and front panel finish to match decking on bleachers.
- 7. Provide removable scorers table.

2.4 FABRICATION

- A. Fabricate understructure from structural steel members in size, spacing, and form required to support design loads specified in referenced safety standard.
- B. Weld understructure to comply with applicable AWS standards.
- C. Round corners and edges of components and exposed fasteners to reduce snagging and pinching hazards.
- D. Form exposed sheet metal with flat, flush surfaces, level and true in line, and without cracking and grain separation.
- E. Seating Supports: Fabricate supports to withstand, without damage to components, the forces imposed by use of stands without failure or other conditions that might impair the usefulness of seating units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas where telescoping stands are to be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Verify that electrical rough-ins have been installed and are accessible.

3.2 INSTALLATION

A. Install telescoping stands to comply with referenced safety standard and manufacturer's written instructions

3.3 ADJUSTING AND CLEANING

- A. On completion of installation, lubricate, test, and adjust each telescoping stand unit so that it operates according to manufacturer's written operating instructions.
- B. Clean installed telescoping stands on exposed and semiexposed surfaces. Touch up shop-applied finishes or replace components as required to restore damaged or soiled areas.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain telescoping stands. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION

SECTION 12 9300

SITE FURNISHINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Benches.
 - 2. Trash receptacles
 - 3. Play Equipment
 - 4. Bicycle Racks

B. Related Sections:

1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:

- 1. Shop Drawings: Indicate locations, dimensions, attachment, and relationship to adjacent construction.
- 2. Product Data: Manufacturer's descriptive data.
- 3. Samples: 3 x 3 inch finish samples showing available colors. each finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Reliance Foundry. (<u>www.reliance-foundry.com</u>)
 - 2. Forms + Surfaces. (<u>www.forms-surfaces.com</u>)
 - 3. Landscape Forms, Inc. (<u>www.landscapeforms.com</u>)
 - 4. Leisure Craft, Inc. (<u>www.leisurecraftinc.com</u>)
 - 5. SiteScapes, Inc. (www.sitescapesonline.com)
 - 6. Victor Stanley (www.victorstanley.com).
- B. Substitutions: Under provisions of Division 01.

2.2 MANUFACTURED UNITS

A. Benches:

- 1. Type: steel.
- 2. Manufacturer: Landscape Forms, Inc. or approved substitute.
- 3. Model: Scarborough Bench Backless
- 4. Size: 72 inches long x 20 inches deep, 17 3/4 inches high at seat, with no backrest.
- 5. Color and finish: silver.

B. Trash and Recycle Receptacles:

1. Type: Steelsites with Integral canopy dome lid and heavy steel latch.

- 2. Manufacturer: Victor Stanley or approved substitute.
- 3. Model: RB 36.
- 4. Color and finish: as selected by Architect from manufacturer's full range (School Color).

C. Bicycle Racks

- 1. Type: steel.
- 2. Manufacturer: Reliance Foundry or approved substitute.
- 3. Model: R 8240-SS Embedded Mounting
- 4. Size: 36 inches high
- 5. Color and finish: Stainless steel.
- 6.

2.3 ACCESSORIES

A. Anchors: Type best suited to application; 300 Series stainless or corrosion resistant coated steel with vandal resistant heads.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install furnishings in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Set plumb, level, and rigid.

END OF SECTION

SECTION 14 24 00 - PASSENGER ELEVATORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Electric Traction Elevators.
- B. Products provided under separate Section:
 - 1. Hoist Beam
 - 2. Pit Ladder
 - 3. Elevator Sump Grate

C. Work Supplied Under Other Sections:

- 1. Temporary lighting, including temporary lighting in hoistway for machine space with switch located in hoistway on the strike jamb side of top landing door.
- 2. Hoistway ventilation shall be in accordance with local and national building code requirements.
- 3. Guide Rail Support shall be structurally adequate to extend from pit floor to top of hoistway, with spans in accordance with requirements of authority having jurisdiction and final layouts.
- 4. Removable barricades at all hoistway openings, in compliance with OSHA 29 CFR 1926.502 in addition to any local code requirements.
- 5. Lifeline attachments capable of withstanding 5000 lb load in accordance with OSHA 29 CFR 1926.502. Provide a minimum of 2 at the top, front of each hoistway.
- 6. Pit lighting: Fixture with switch and guards. Provide illumination level equal to or greater than that required by ASME A17.1/CSA B44 2000, or applicable version.
- 7. Control space lighting with switch. Coordinate switch with lighting for machine space as allowable by code.
- 8. Access Doors: As required for access to governor. Access door shall be self-closing, self-locking if necessary and operable from the inside without a key.

D. Industry and government standards:

- 1. ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
- 2. ADAAG Accessibility Guidelines for Buildings and Facilities
- 3. ANSI/NFPA 70, National Electrical Code
- 4. ANSI/NFPA 80, Standard for Fire Doors and Fire Windows
- 5. ASME/ANSI A17.1, Safety Code for Elevators and Escalators.

1.2 DESCRIPTION OF ELEVATOR

- A. Elevator Equipment: (Basis-of-Design) KONE EcoSpace™ gearless traction elevator
- B. Equipment Control: KCM831
- C. Quantity of Elevators: 1
- D. Landings: 2
- E. Openings: 2 Front Openings
- F. Travel: Refer to Drawings
- G. Rated Capacity: 3500 lbs
- H. Rated Speed: 150 fpm
- I. Clear Inside Dimensions (W x D): 6'-8" x 5'-6"
- J. Cab Height: 8'

- K. Clear height under suspended ceiling: 7'9"
- L. Entrance Width & Type: 4'-0"; Right Opening
- M. Entrance Height: 7'
- N. Main Power Supply: 480 Volts + 5%, three-phase
- O. Operation: Simplex
- P. Machine Location: Inside the hoistway mounted on car guide rail
- Q. Control Space Location: Remote Closet
- R. Elevator Equipment shall conform to the requirements of seismic zone: Class E.
- S. Provide phone line monitoring in conformance with ASME 2009 elevator codes, including audible alarm.
- T. Maintenance Service Period: 24 Months
- U. Protective Pads: Provide two sets of quilted fire retardant protective pads and hooks.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature for each proposed system.
 - 1. Cab design, dimensions and layout.
 - 2. Layout, finishes, and accessories and available options.
 - 3. Controls, signals and operating system.
 - 4. Color selection charts for cab and entrances.

B. Shop Drawings:

- 1. Clearances and travel of car.
- 2. Clear inside hoistway and pit dimensions.
- 3. Location and layout of equipment and signals.
- 4. Car, guide rails, buffers and other components in hoistway.
- 5. Maximum rail bracket spacing.
- 6. Maximum loads imposed on building structure.
- 7. Hoist beam requirements.
- 8. Location and sizes of access doors.
- 9. Location and details of hoistway door and frames.
- 10. Electrical characteristics and connection requirements.
- C. LEED Submittals: Product data indicating VOC content in g/L for field-applied adhesives, sealants, paints and coatings; product data indicating no added urea formaldehyde in composite wood and laminating adhesives; comply with Section 01 61 16.
- D. LEED Submittal for Credit ID 1: Documentation for Elevator Process Energy Savings, manufacturer's documentation indicating environmental benefits and calculation for energy savings.
- E. Operation and maintenance data:
 - 1. Provide manufacturer's standard maintenance and operation manual.
- F. Samples for Verification: For exposed finishes of cars, hoistway doors and frames, and signal equipment; 3-inch- square Samples of sheet materials; and 4-inch lengths of running trim members
- G. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

- H. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
 - a. Diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.
- I. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
 - 1. As required by Maryland State law, the Contractor must have a Qualified Elevator Inspector conduct the required inspection prior to the State elevator inspection.
 - 2. Include all necessary third-party inspections required prior to the State elevator inspection, within the Contract.
 - 3. The cost of the State inspection call-backs or additional third-party inspections, resulting from additional or missed items following the initial third-party inspection, will not be an additional cost to the Owner.
- J. Field Quality Control Certificate: Final inspection and maintenance certificate specified in this Section.
- K. Warranty: Special warranty specified in this Section.
- L. Continuing Maintenance Proposal: Service agreement specified in this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Minimum of ten years experience in the fabrication, installation and service of elevators of the type and performance of the specified. The manufacturer shall have a documented quality assurance program.
- B. Installer: The equipment manufacturer shall install the elevator.
- C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections and tests.
- D. Source Limitations: Obtain elevators through one source from a single manufacturer. Only elevator systems and components manufactured in the United States are acceptable for use on this Project.
- E. Regulatory Requirements: Comply with ASME A17.1.
 - 1. Elevator importance factor is 1.0.
- F. Accessibility Requirements: Comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
- G. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.
- H. Product Requirements:
 - 1. Adhesive and sealants used on the interior of the building must meet SCAQMD and aerosol adhesives that meet Green Seal Standard GS-36.
 - 2. Bonding agent for composite wood products can not contain added ureaformaldehyde.

1.5 DELIVERY, STORAGE AND HANDLING

- A. If the construction site is not prepared to receive the elevator equipment at the agreed ship date, the General Contractor shall be responsible to provide a safe, dry, and easily accessible storage area on or off the premises. Additional labor costs for double handling will be the responsibility of the general contractor.
- B. Delivered elevator materials shall be stored in a protected environment in accordance with manufacturer recommendations. A minimum storage area of 10 feet by 20 feet is required adjacent to the hoistway.

1.6 COORDINATION

- A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.
- B. Furnish well casing and coordinate delivery with related excavation work.
- C. Coordinate sequence of elevator installation with other work to avoid delaying the Work.
- D. Coordinate locations and dimensions of other work relating to elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

17 WARRANTY

- A. Provide manufacturer warranty for a period of two years. The warranty period is to begin upon Substantial Completion of the Contract. Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.
 - 1. Notification: Notify Owner, in writing, 60 days in advance of date of expiration of warranty. Failure to notify Owner by required time shall automatically extend warranty to 60 days after written notification is received by Owner at no additional cost to Owner. Extended warranty period shall be considered part of, and manufacturer is fully responsible for Work described in original warranty.
 - 2. Warranty Claim: Warranty claims made by Owner prior to expiration of warranty shall be satisfied even though the warranty has subsequently expired.

1.8 MAINTENANCE SERVICE

- A. The elevator manufacturer shall provide maintenance service consisting of regular examinations and adjustments of the elevator equipment for a period of 24 Months after date of substantial completion. Replacement parts shall be produced by the original equipment manufacturer.
- B. Maintenance service be performed during regular working hours of regular working days and shall include regular time call back service.
- C. Maintenance service shall not include adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents.
- D. Include 24-hour-per-day, 7-day-per-week emergency callback service.
 - 1. Response Time: Two hours or less.
- E. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner, in the form of a standard two-year maintenance agreement, starting on date initial

maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Provide AC gearless machine room-less elevator systems subject to compliance with the design and performance requirements of this specification. Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis of Design: EcoSpace™ traction elevators by KONE, Inc. (www.kone.com).
 - 2. Other acceptable machine room-less products:
 - a. Otis Elevator Co. Gen2TM Product
 - b. Schindler Elevator Corp. 400A Product

2.2 EQUIPMENT: CONTROL COMPONENTS AND CONTROL SPACE

- A. Controller: Provide microcomputer based control system to perform all of the functions.
 - 1. All high voltage (110V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.
 - 2. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed and physically segregated from the rest of the controller.
 - 3. Provide a serial cardrack and main CPU board containing a non-erasable EPROM and operating system firmware.
 - 4. Variable field parameters and adjustments shall be contained in a non-volatile memory module
- B. Drive: Provide Variable Voltage Variable Frequency AC drive system to develop high starting torque with low starting current.
- C. Controller Location: Within 100'-0" (30.48m) Controller(s) shall be located in a remote cabinet or room within 140"-0" (42.6 m) wire feet of the elevator machine.

2.3 EQUIPMENT: HOISTWAY COMPONENTS

- A. Machine: AC gearless machine, with permanent magnet synchronous motor, direct current electro-mechanical disc brakes and integral traction drive sheave, mounted to the car guide rail at the top of the hoistway.
- B. Governor: Friction type over-speed governor rated for the duty of the elevator specified.
- C. Buffers, Car and Counterweight: Polyurethane buffer.
- D. Hoistway Operating Devices:
 - 1. Emergency stop switch in the pit
 - 2. Terminal stopping switches.
 - 3. Emergency stop switch on the machine
- E. Positioning System: System consisting of magnets and proximity switches.
- F. Guide Rails and Attachments: Steel rails with brackets and fasteners.

2.4 EQUIPMENT: HOISTWAY ENTRANCES

- A. Hoistway Entrances
 - 1. Sills: extruded.
 - 2. Doors: Hollow metal construction with vertical internal channel reinforcements.

- 3. Fire Rating: Entrance and doors shall be UL fire-rated for 1-1/2 hour.
- 4. Entrance Finish: Brushed stainless steel frame.
- 5. Entrance Markings Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.
- 6. CAR FRONT FINISH: SATIN STAINLESS STEEL, NO. 4 FINISH. Car Front Finish: Satin Stainless Steel, No. 4 Finish.

2.5 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door reopening devices with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams shall cause doors to stop and reopen.
- B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.6 EQUIPMENT: CAR COMPONENTS

- A. Car Frame: Provide car frame with adequate bracing to support the platform and car enclosure.
- B. Platform: Platform shall be all steel construction.
- C. Car Guides: Provide guide-shoes mounted to top and bottom of both car and counterweight frame. Each guide-shoe assembly shall be arranged to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.

D. Steel Cab:

- 1. Car Wall Finish: Plastic laminate with stainless steel reveals; no added urea formaldehyde.
- 2. Car Door Finish: Satin stainless steel, No. 4 finish.
- 3. Ceiling: Kone LF-98 Satin Stainless Steel with Rectangular LED Lighting.
- 4. Handrail:
 - a. 1-1/2 inches round satin stainless steel with return ends, No. 4 finish, at sides of car.
- 5. Flooring: Floor prepared to receive scheduled flooring.
- 6. Threshold: Aluminum
- 7. Field-applied adhesives, sealants, paints and coatings: Comply with Section 016116 for low-emitting requirements.
- 8. Composite wood and laminating adhesives: no added urea formaldehyde.

E. Emergency Car Signals:

- 1. Emergency Siren: Siren mounted on top of cab that is activated when the alarm button in the car operating panel is engaged. Siren shall have rated sound pressure level of 80 dB(A) at a distance of three feet from device. Siren shall respond with a delay of not more than one second after activation of alarm button.
- 2. Emergency Car Lighting: Provide emergency power unit employing a 12-volt sealed rechargeable battery and totally static circuits shall illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
- 3. Emergency Exit Contact: An electrical contact shall be provided on the cart op exit.
- F. Ventilation: No fan.

2.7 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel: Provide car operating panel with all push buttons, key switches, and message indicators for elevator operation; provide KONE full-height Style Leaves in flax yellow color.
 - 1. Car operating panel shall contain a bank of mechanical, illuminated buttons marked to correspond to landings served, emergency call button, door open button, door close button, and key switches for lights, inspection, and exhaust fan. All buttons to have raised text and Braille marking on left hand side. The car operating panel shall have a brushed stainless steel finish.
 - 2. Additional features of car operating panel shall include:
 - a. Car Position Indicator within operating panel (amber).
 - b. Elevator Data Plate marked with elevator capacity and car number on car top.
 - c. Help button markings with raised markings.
 - d. In car stop switch per local code.
 - e. Firefighter's hat.
 - f. Firefighter's Phase II Key-switch.
 - g. Call Cancel Button.
 - h. Pre-programmed integrated ADA phone (complete description of krms features included as standard).
 - 1) Provide phone line monitoring in conformance with ASME 2009 elevator codes, including audible alarm.
 - Help Button/Communicator. Activation of help button will initiate two- way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
 - j. Firefighter's Phase II emergency in-car operating instructions.
- B. Hall Fixtures: Wall mounted hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. Wall mounted hall fixtures shall have a brushed stainless steel finish.
 - 1. Hall fixtures shall feature round, mechanical, illuminated buttons in raised fixture housings. Hall fixtures shall correspond to options available from that landing. Buttons shall be flat flush in vertically mounted fixture. Hall fixtures should not be jamb-mounted. Hall lanterns shall feature amber illumination.
- C. Hall Lanterns and Chime: A directional lantern visible from the corridor shall be provided at each hall entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound. The chime will sound once for up and twice for down.
 - 1. KONE Series Design Signalization; Sand Yellow color.

2.8 EQUIPMENT: ELEVATOR OPERATION AND CONTROLLER

- A. Elevator Operation:
 - 1. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.
 - 2. Zoned Car Parking.
 - 3. Relative System Response Dispatching.

- B. Standard Operating Features to include:
 - 1. Full Collective Operation
 - 2. Fan and Light Control.
 - 3. Load Weighing Bypass.
 - 4. Ascending Car Uncontrolled Movement Protection
 - 5. Top of Car Inspection Station.
- C. Additional Operating Features to include:
 - 1. Independent Service.
 - 2. Car Secure Access.
 - Provision for Card Reader in Car.
- D. Elevator Control System for Inspections and Emergency:
 - 1. Provide devices within controller to run the elevator in inspection operation.
 - 2. Provide devices on car top to run the elevator in inspection operation.
 - 3. Provide within controller an emergency stop switch to disconnect power from the brake and prevents motor from running.
 - 4. Provide the means from the controller to mechanically lift and control the elevator brake to safely bring car to nearest available landing when power is interrupted.
 - 5. Provide the means from the controller to reset the governor over speed switch and also trip the governor.
 - 6. Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed.
 - 7. Provide the means for the control to reset elevator earthquake operation.

2.9 EQUIPMENT: DOOR OPERATOR AND CONTROL

- A. Door Operator: A closed loop permanent magnet VVVF high-performance door operator shall be provided to open and close the car and hoistway doors simultaneously. Door movement shall be cushioned at both limits of travel. Electro- mechanical interlock shall be provided at each hoistway entrance to prevent operation of the elevator unless all doors are closed and locked. An electric contact shall be provided on the car at each car entrance to prevent the operation of the elevator unless the car door is closed.
- B. The door operator shall be arranged so that, in case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Emergency devices and keys for opening doors from the landing shall be provided as required by local code.
- C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. A door open button shall be provided in the car. Momentary pressing of this button shall reopen the doors and reset the time interval.
- D. Door hangers and tracks shall be provided for each car and hoistway door. Tracks shall be contoured to match the hanger sheaves. The hangers shall be designed for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed-for-life bearings.
- E. Electronic Door Safety Device. The elevator car shall be equipped with an electronic protective device extending the full height of the car. When activated, this sensor shall prevent the doors from closing or cause them to stop and reopen if they are in the process of closing. The doors shall remain open as long as the flow of traffic continues and shall close shortly after the last person passes through the door opening.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Field measure and examine substrates, supports, and other conditions under which elevator work is to be performed.
- B. Do not proceed with work until unsatisfactory conditions are corrected.
- C. Prior to start of Work, verify hoistway is in accordance with shop drawings. Dimensional tolerance of hoistway from shop drawings: -0 inches +2 inches. Do not begin work of this section until dimensions are within tolerances.
- D. Prior to start of Work, verify projections greater then 2 inches (4 inches if ASME A17.1/CSA B44 2000 applies) must be beveled not less then 75 degrees from horizontal.
- E. Prior to start of Work, verify landings have been prepared for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.
- F. Prior to start of Work, verify elevator pit has been constructed in accordance with requirements, is dry and reinforced to sustain vertical forces, as indicated in approved submittal. Verify that sumps or sump pumps located within pit will not interfere with installed elevator equipment.
- G. Prior to start of Work, verify control space has been constructed in accordance with requirements, with access coordinated with elevator shop drawings, including Sleeves and penetrations.
- H. Verify installation of GFCI protected 20-amp in pit and adjacent to each signal control cabinet in control space.

3.2 PREPARATION

A. Coordinate installation of anchors, bearing plates, brackets and other related accessories.

3.3 INSTALLATION

- A. Install equipment, guides, controls, car and accessories in accordance with manufacturer installation methods and recommended practices.
- B. Properly locate guide rails and related supports at locations in accordance with manufacturer's recommendations and approved shop drawings. Anchor to building structure using isolation system to minimize transmission of vibration to structure.
- C. All hoistway frames shall be securely fastened to fixing angles mounted in the hoistway. Coordinate installation of sills and frames with other trades.
- D. Lubricate operating system components in accordance with manufacturer recommendations.
- E. Perform final adjustments, and necessary service prior to substantial completion.

3.4 CONSTRUCTION

- A. Interface with Other Work:
 - 1. Guide rail brackets attached to steel shall be installed prior to application of fireproofing.
 - 2. Coordinate construction of entrance walls with installation of door frames and sills. Maintain front wall opening until elevator equipment has been installed.
 - a. Ensure adequate support for entrance attachment points at all landings.
 - b. Coordinate wall openings for hall push buttons, signal fixtures and sleeves. Each elevator requires sleeves within the hoistway wall.

- c. Coordinate emergency power transfer switch and power change pending signals as required for termination at the primary elevator signal control cabinet in each group.
- d. Coordinate interface of elevators and fire alarm system.
- e. Coordinate interface of dedicated telephone line.

3.5 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.
- C. Final Inspection and Maintenance: Within seven days before Substantial Completion, Installer shall return to site and inspect elevators, clean equipment, and replace hoist equipment packings. Provide written certification with date that final inspection and maintenance was performed and indicate that the elevator is operating properly.

3.6 PROTECTION

- A. Temporary Use: Do not permit use of elevators for construction purposes or during construction period without written permission from Architect. When permitted, limit temporary use for construction purposes to one elevator. Comply with the following requirements for elevator used for construction purposes:
 - 1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
 - 2. Provide strippable protective film on entrance and car doors and frames.
 - 3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.
 - 4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
 - 5. Do not load elevators beyond their rated weight capacity.
 - 6. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
 - 7. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.7 TESTING AND INSPECTIONS

- A. Perform recommended and required testing in accordance with authority having jurisdiction.
- B. Obtain required permits and provide originals to Owner's Representative.

3.8 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate elevator(s). Refer to Division 1 Section "Demonstration and Training."
- B. Check operation of each elevator with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

C. Check operation of each elevator with Owner's personnel present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

END OF SECTION