

# Specifications for the **DEPLOYABLE PARTS STORAGE FACILITY**

187th Fighter Wing Dannelly Field - AL ANG  
Montgomery, AL

# SSL&L

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**DEPLOYABLE PARTS STORAGE  
DANNELLY FIELD, MONTGOMERY, AL**

**19084/FAKZ189366**

**TYPE B-3 (100%)  
APRIL 10, 2025**

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**SECTION 000102 - PROJECT INFORMATION AND SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT IDENTIFICATION**

- A. Government Project Number: FAKZ182356.
- B. Architect's Project Number: 19084.
- C. The Owner, hereinafter referred to as the Government: Alabama Air National Guard.
- D. Owner's Representatives:
  - 1. Contracting Officer (KO): Mr. Craig Kast
  - 2. Contracting Specialist: Mr. Stephen Shanks
  - 3. Contracting Officer Representative: Major Adam Sanders, Base Civil Engineer
  - 4. Alternate Contracting Officer Representative: Major Nathan Brock, Deputy Base Civil Engineer

**1.02 CONTRACT DURATION**

- A. 275 calendar days from notice to proceed to Beneficial Occupancy, this is in addition to 30 days for the punch list to be completely accomplished. The Government intends to occupy the building upon Beneficial Occupancy. The Contractor will be responsible for coordinating punch list activities around the Government's activities if both are occurring at the same time.

**1.03 PROJECT DESCRIPTION**

- A. Project scope includes sitework, subgrade excavation, building foundations, structural, architectural, plumbing, mechanical, electrical and extension of existing utilities for a new single addition to the recently constructed Base Supply Facility. The proposed project includes the following:
  - 1. Vertical construction will consist of work on one facility as an addition to an existing facility. The existing facility is the New Base Supply Complex which is an approximate 39,000 square foot building housing the Base's Logistic Readiness Squadron (LRS). Within the new Base Supply Complex, special facilities include non-secure and secure office space, storage space, loading dock, secure vaults, meeting and training rooms, and a break room.
  - 2. The addition will include approximately 6,00 square feet of storage space that will house the Base's Deployable Parts Storage mission associated with the F-35 Fighter Jet

3. Special attention will need to be paid to layout, erosion control, and laydown operations due to the limitations of the site, adjacent finished construction, and existing utilities on site.
  4. The new building's structural system includes slab on grade with engineered fill soil stabilization, structural steel framing as well as load bearing masonry, open web joists with form deck, and metal floor decking. The roof will have sloped insulated standing seam metal roof panels. The exterior walls include veneer brick, storefront, and insulated metal wall panels.
  5. Major building systems are limited to exhaust fans, gas fired makeup air units, and gas fired unit heaters.
  6. Specialty equipment included in the project includes HVLS fans.
  7. All utilities will be served from the existing Base Supply Facility. This includes, but is not limited to necessary power, storm, gas, water, and data infrastructure. Coordination will be required with existing utilities to maintain operation in the existing Base Supply complex and will include power, storm, gas, water, and data. New electrical panel will be required within the existing electrical room.
  8. Site work will comprise of on-site parking, pedestrian paving, landscape and retaining walls, sodding, and landscape planting.
- B. Antiterrorism and Building Standoff Requirements:
1. The project site and building structural, architectural, electrical and mechanical systems have been designed to meet the prescribed levels of protection against terrorist attacks in accordance with the Department of Defense (DoD) Unified Facilities Criteria (UFC) 4-010-01 DoD Minimum Antiterrorism Standards for Buildings.
- C. Special Access Program Facilities (SAPF)
1. Special Access Program Facilities are not included in the scope of the project.
- D. Intrusion Detection System (IDS), Access Controls, and CCTV:
1. The IDS system must be fully compatible with the existing USAF approved Advantor IDS Annunciator located in the 187th SFS BDOC and will be tied into the existing IDS system located in the Base Supply Complex.
  2. As part of the base bid, the contractor is responsible for engaging Advantor Systems Cooperation (which is a sole source security system) for the procurement (purchase) and installation of the IDS, Access Controls, and CCTV systems. Refer to limited source justification included in the solicitation documents furnished by the Government.

3. The base bid shall include all plant, labor, and materials to provide all collateral support as required by Advantor (in addition to collateral support indicated in the contract documents) for installation of a fully operational IDS, Access Control, and CCTV systems as defined by Advantor System Corporation.
  4. The required scope of work is as outlined in the drawings. Advantor systems assisted in the design of the security systems and have furnished a "quote" as part of the design process. The "quote" is included in the project specifications for for reference and identification of the required devices/materials. The Contractor shall contact ADVANTOR and receive an updated "quote" as part of the bid process. All costs to install a complete and operation IDS< ACS, and CCTV systems shall be included in the Contractor's bid.
- E. Owner Furnished Furniture, furnishings and Equipment (FF&E):
1. Contractor's base bid shall include rough-ins for plumbing, mechanical, and electrical; including installation and final connection of all items indicated on the drawings as Owner Furnished Contractor Installed (OFCI).

#### **1.04 PERMITS, FEES AND NOTICES**

- A. Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are customarily secured after award of the Construction Contract and which are in effect on the date of receipt of bids.
1. City of Montgomery Buidling Permit will not be required.
- B. The Contractor shall comply with and give notices required by all laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

#### **1.05 USE OF SITE AND MISC. REQUIREMENTS**

- A. The space available to the contractor for the performance of the work, either exclusively or in conjunction with others performing other construction as part of the project, is as per the Owner's approval.
1. Other areas are off limits to all construction personnel.
- B. Access to site will be limited; obtain Owner's approval of proposed routes of access.
- C. Keep existing sidewalks, roads, parking lots and drives on site clear and available at all times. Promptly remove mud, dirt, debris, etc. from sidewalks, streets, and public right-of-way during construction as it occurs.
- D. Storage areas on site are very minimal and will be limited to materials that are to be immediately used in the progress of the work. If additional storage is required, then Contractor shall secure and be responsible to pay for such off site storage in a fully

bonded and insured facility acceptable to the Government, with all items clearly identified as being assigned to this project.

1. Contractor will be limited to the areas included within the project limits shown on the civil drawings.
- E. Provide secure temporary barricades, fencing, etc. as required to separate the public from construction operations. Compliant safety and/or warning signage is to be provided as well in conjunction with fencing and barricades.
1. Site safety and security is the General Contractor's responsibility. Fencing shall be provided as deemed necessary to protect the site from theft and damage and to prevent access to the site by the public. A fence along the project limits is anticipated at a minimum. However, exact location/extents of fencing is at the discretion of the Contractor. Removal of project boundary fencing along the Northern boundary of the project limits and connection of project fencing with fencing of the adjacent base supply project would be acceptable if agreed upon by both Contractors.
- F. Construction operations are not to affect any of the ongoing operations thought the site and/or adjacent sites. Construction equipment is not to be attached to, or swing over existing buildings to remain, public areas, occupied buildings or parking lots, right-of-ways, etc.
- G. Comply with the Government's security requirements - refer to specification section 01 3553.
- H. The contractor shall provide all testing, inspections, and similar services; these services also include those specified to be performed by an independent agency.
1. Where indicated on the drawings work outside of the site extents may be require to connect to existing/new utilities.

#### **1.06 UTILITY OUTAGES AND SHUTDOWN**

- A. All electrical and communication shut downs shall be performed on a non-working day for the Government(Saturday, Sunday, Monday, or Holidays) unless specifically approved by the base Contracting Officer Representative.
- B. Limit shutdown of utility services to 8 hours at a time, arranged at least 72 hours in advance with the Government.
- C. Prevent accidental disruption of utility services to other facilities.

#### **1.07 PHASING OF WORK**

- A. The work of this project shall be completed in one phase. However, the Contractor shall coordinate the work as required to ensure all existing roadways and facilities adjacent to the project site remain open and accessible for use by the Government.

**1.08 WORK SEQUENCE**

- A. Coordinate construction schedule and operations with Contracting Officer Representative.
- B. Extension of existing utilities shown on the drawings must be properly sequenced with work associated with the addition so that shutdown of utility service(s) in the Base Supply Complex is limited.

**1.09 PROJECT CONSULTANTS**

- A. The Architect, hereinafter referred to as The Government: Seay Seay & Litchfield P.C..
  - 1. Address: 1115 South Court Street.
  - 2. City, State, Zip: Montgomery AL 36104.
  - 3. Phone/Fax: 334-263-5162 334-263-5170.
  - 4. Project Manager: Jake Johnson, AIA
  - 5. Principals-in-Charge: Wes R. Osmer, AIA, LEED AP
- B. Architect's Consultants:
  - 1. Civil Engineering:
    - a. Professional Engineering Consultants
    - b. Address: 822 South McDonough St..
    - c. City, State, Zip: Montgomery, AL, 36104.
    - d. Phone/Fax: 334-262-7307 / 334-262-7309.
    - e. Contact: Steve Green - Pat Moseley
  - 2. Structural Engineering:
    - a. Blackburn Daniels O'Barr, Inc.
    - b. Address: 8805 County Rd. 40E
    - c. City, State, Zip: Lowndesboro, AL, 36752.
    - d. Phone/Fax: 334-265-0206 / 334-265-0207.
    - e. Contact: Mark O'Barr
  - 3. Plumbing, Mechanical & Fire Suppression Engineering:
    - a. Morris Engineering

- b. Address: 903 South Perry Street
  - c. City, State, Zip: Montgomery, AL, 36104
  - d. Phone: 334-269-0329
  - e. Contact: Jack Morris, P.E.
4. Electrical Engineering:
- a. Garner & Associates Engineering, PC
  - b. Address: 903 South Perry Street
  - c. City, State, Zip: Montgomery, AL 36104
  - d. Phone: 334-269-0329
  - e. Contact: Morgan Garner, P.E.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 010450 - CUTTING AND PATCHING**

**1. GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including requirements of the Government's Solicitation and other Division-1 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
  - 1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 21, 22, 23,26, and 27 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

**1.03 SUBMITTALS**

- A. Cutting and Patching Proposal: Where approval of procedures and/or phasing for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
- B. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
- C. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
- D. List products to be used and firms or entities that will perform Work.
- E. Indicate dates when cutting and patching is to be performed.
- F. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
- G. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.

- H. Approval by the Contracting Officer to proceed with cutting and patching does not waive the Contracting Officer's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

#### **1.04 QUALITY ASSURANCE**

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
- B. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
1. Foundation construction.
  2. Bearing and retaining walls.
  3. Structural concrete.
  4. Structural steel.
  5. Lintels.
  6. Timber and primary wood framing.
  7. Structural decking.
  8. Stair systems.
  9. Miscellaneous structural metals.
  10. Exterior curtain wall construction.
  11. Equipment supports.
  12. Piping, ductwork, vessels and equipment.
  13. Structural systems of special construction in Division-13.
- C. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
    - a. Primary operational systems and equipment.
    - b. Membranes and flashings.
    - c. Fire protection systems.
    - d. Communication systems.

- e. Electrical wiring systems.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

## **PART 3 EXECUTION**

### **3.01 INSPECTION**

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
  - 1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

### **3.02 PREPARATION**

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

### **3.03 PERFORMANCE**

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
  - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures

with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
  3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
  4. Comply with requirements of applicable Sections of Division-2 where cutting and patching requires excavating and backfilling.
  5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
  2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.
    - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken containing the patch, after the patched area has received primer and second coat.
  4. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

### **3.04 CLEANING**

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other

finishing is applied. Restore damaged pipe covering to its original condition.

**END OF SECTION 01045**

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## **1. GENERAL**

### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Requirements of the Government's Solicitation and other Division-1 Specification Sections, apply to this Section.

### **1.02 SUMMARY**

- A. General: This Section specifies administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:
  - 1. Land Survey Work.

### **1.03 SUBMITTALS**

- A. Certificates: Submit a certificate signed by the Land Surveyor or Professional Engineer certifying that the location and elevation of improvements comply with the Contract Documents.
- B. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of Sections "Submittals" and "Project Closeout".

### **1.04 QUALITY ASSURANCE**

- A. Surveyor: Engage a Registered Land Surveyor registered in the State where the project is located, to perform land surveying services required.

## **PART 2 PRODUCTS (NOT APPLICABLE)**

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. The Government will identify existing control points and property line corner stakes.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
  - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.

2. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.
- C. Establish and maintain a minimum of one permanent benchmark on the site, referenced to data established by survey control points.
  1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- D. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.
  1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.
  2. The Government requires a dig permit to be submitted for and approved prior to drilling or digging that might impact underground utilities. Coordinate with Contracting Officer Representative in advance of activities requiring an approved dig permit. Submit permit application to Base Civil Engineering a minimum of one week prior to scheduled start of activities requiring a dig permit.

### **3.02 PERFORMANCE**

- A. Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
  1. Advise entities engaged in construction activities, of marked lines and levels provided for their use.
  2. As construction proceeds, check every major element for line, level and plumb.
- B. Surveyor's Log: Maintain a surveyor's log of control and other survey Work. Make this log available for reference.
  1. Record deviations from required lines and levels, and advise the Contracting Officer when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
- C. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

- D. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical Work.
  
- E. Existing Utilities: Verify locations of all utilities prior to commencing. Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction with construction.

**END OF SECTION 01050**

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**SECTION 012000 - PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Procedures for preparation and submittal of application for final payment.

**1.02 SCHEDULE OF VALUES**

- A. Use Schedule of Values Form: Government's Approved Form.
- B. 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.
  - 1. Provide separate line items for each floor of the building where applicable.
  - 2. Provide separate line items for each separate structure where applicable.
  - 3. Provide separate line items for the following:
    - a. Bonds
    - b. Insurance
    - c. Superintendent
    - d. Quality Control Representative
    - e. On Site Office Cost, utilities, and supplies
  - 4. Break larger items of work down into line items not exceeding \$50,000 unless approved by the Government.
- C. Revise schedule to list approved Change Orders, with each Application For Payment.
  - 1. Change Orders should be listed as separate line items included at the end of the schedule of values.
  - 2. When a Change Order includes multiple items of work, each item of work shall be listed as a separate line item with the approximate percentage complete for each scope of work listed.
- D. Submit schedule of values within the timeframe outlined in the General Conditions of the Contract for Construction.

**1.03 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Comply with all requirements of the General Conditions of the Contract for Construction. Additional requirements/explanations are listed below.
- B. Use Form Government's Approved Form.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified, submit sample to the Government for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Stored Materials
  - 7. Authorized Change Orders.
  - 8. Total Completed and Stored to Date of Application.
  - 9. Percentage of Completion.
  - 10. Balance to Finish.
  - 11. Retainage.
- 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 and for stored products.
  - 1. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- H. Include the following with the application:
  - 1. Transmittal letter as specified for submittals in Section 013000.
  - 2. Construction progress schedule, revised and current as specified in Section 013000.
  - 3. Current construction photographs specified in Section 013000.

#### **1.04 STORED MATERIALS**

- A. Off-site stored materials must be authorized for consideration in the awarded contract and be approved by the Contracting Officer if the Contactor anticipates requesting payment for off-site stored materials prior to the materials being delivered to the project site and and/or placed into operation/construction.
- B. The following will be required prior to approval of payment for off-site stored materials:
  - 1. Bill of lading for materials.
  - 2. Documentation that the materials have been titled to the Contractor and will be used exclusively in the performance of the Contract.
  - 3. Evidence of insurance for the facility storing the materials reflecting 100% total replacement value coverage.
  - 4. Photographs of the materials being stored.
- C. The Contracting Officer must verify and approve of off-site stored materials prior to approval of payment. Approval of off-site storage (item A above) will not guarantee approval of payment for off-site stored materials. Payment of off-site stored materials will be at the discretion of the Contracting Officer pending verification of the materials being stored and review of required documentation (item B above) offered by the Contractor with the application for payment.

#### **1.05 MODIFICATION PROCEDURES**

- A. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
- B. Do not proceed with work associated with a modification prior to final execution of modification by Contracting Officer.
- C. Following execution of modification by the Contracting Officer, promptly:
  - 1. Revise application of payment forms to record each authorized modification as a separate line item and adjust the Contract Price.
  - 2. Revise progress schedules to reflect any change in Contract Time.
  - 3. Enter changes in Project Record Documents.

#### **1.06 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. Comply with all requirements of the General Conditions of the Contractor for Construction.
- C. Application for Final Payment will not be considered until the following have been accomplished:
  - 1. All closeout procedures specified in Section 017000.
  - 2. All stipulated requirements stated in the General Conditions of the Contract for Construction. .

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Description of Bid Options.
- B. Procedures for pricing Bid Options.

**1.02 ACCEPTANCE OF Bid Options**

- A. Bid Options quoted on Bid Forms will be reviewed and accepted or rejected at the Government's option in accordance with the requirements of the Contract Documents. Accepted Bid Options will be identified in the Construction Contract.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Bid Option.

**1.03 SUMMARY**

- A. Definition: A Bid Option is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to the Base Bid amount if the Government decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents. The base Bid is all items shown on the the Contract Documents except items to be added back by below schedule of Bid Options.
- B. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Bid Options and/or contract option is complete and fully integrated into the project.
- C. Schedule: A "Schedule of Bid Options" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each Bid Option.
- D. Include as part of each Bid Option, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the Bid Option.

**1.04 SCHEDULE OF Bid Options**

**A. Bid Option No. 1 (Additive): Sodding**

- 1. This Bid Option shall include all plant, labor, and material for the following:
  - a. Provide and install sodding as shown on drawings and specified in section 32 9223 Sodding. In addition, all areas disturbed by construction shall receive sodding.

**B. Bid Option No. 2 (Additive): West Parking Lot Addition:**

1. This Bid Option shall include all plant, labor, and material for the following:
  - a. Grading, underground utilities, subsurface preparation, asphalt paving and associated components, curb and gutter, concrete paving, and other items outlined on sheets C2.1, C3.1, C4.1, C5.1.
  - b. In the event that the Bid Option is not awarded, provide finish grading and grass seeding on all disturbed earth in accordance with Specification Section 32 9219

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 013000 - ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electronic document submittal service.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Contractor's daily reports.
- F. Progress photographs.
- G. Coordination drawings.
- H. Number of copies of submittals.
- I. Section 01 1000 - Summary:
- J. Section 01 7000 - Execution and Closeout Requirements
- K. Section 01 7800 - Closeout Submittals

**1.02 CONTRACTOR'S PROJECT ADMINISTRATION REQUIREMENTS**

- A. Contractor's Project Manager: responsible for overall project coordination. .
- B. Make the following types of submittals to Contracting Officer Representative 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 Beneficial Occupancy.
  11. Closeout submittals.
- C. The Contractor shall provide project manager with minimum of five years experience on projects of similar size, scope, complexity, and cost. Project manager must be a full time employee of the General Contractor. Prior to construction the Contractor shall submit a resume of the project manager to the Government for approval.
- D. In addition to the project manager, the Contractor shall provide a project superintendent who is dedicated, full time, to the project site. The construction superintendent shall have a minimum of five years experience serving as a project superintendent on projects of similar size, scope, complexity and cost. Prior to construction Contractor shall submit a resume of the project manager to the Government for approval.
- E. The Contractor shall also identify a secondary Construction Superintendent that can fulfill the role of Construction Superintendent in the planned or unexpected absence of the full time construction superintendent. The secondary project superintendent requirement can be satisfied by the Project Manager or another employee of the General Contractor who possesses the commensurate expertise, experience, and project knowledge necessary to fulfill the responsibilities of the full time Construction Superintendent. Either the Construction Superintendent or Secondary Construction Superintendent must be on site at all times that any work is being performed by the General Contractor's personnel or any personnel from one of the project subcontractors.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE**

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
  2. The Contractor, Government, and Architect are required to use this service.

3. It is Contractor's responsibility to submit documents in allowable format.
  4. Subcontractors, suppliers, and The Government's consultants will be permitted to use the service at no extra charge.
  5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, [www.adobe.com](http://www.adobe.com), or Bluebeam PDF Revu, [www.bluebeam.com](http://www.bluebeam.com)), unless such software capability is provided by the service provider.
  6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed. Upon review and response to submittals, the Contractor shall furnish the Government with one paper copy of the reviewed submittal (complete with all review comments and markups by the Government) to the Government for project records.
  7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service will be paid by the Architect.
- C. Submittal Service: The selected service is:
1. Newforma Project Cloud: [www.newformaprojectcloud.com/#sle](http://www.newformaprojectcloud.com/#sle).

### **3.02 PRECONSTRUCTION MEETING**

- A. Project Coordinator will schedule a meeting after Notice of Award.
- B. Contractor will schedule a meeting after notice to proceed.
- C. Attendance Required:
  1. Contracting Officer Representative
  2. The Government.
  3. Contractor.
  4. All major sub contractors and suppliers.
  5. Contracting Officer.
- D. Agenda:
  1. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  2. Submission of initial Submittal schedule.

3. Designation of personnel representing the parties to Contract and .
  4. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  5. Scheduling.
  6. Use of "Newforma" online web application for RFI, submittals, etc... Refer to section 01 3001 for additional information.
- E. Architect will record minutes and distribute copies after meeting to participants, with [ < > ] copies to Architect, Contracting Office Representative, Contracting Officer, participants, and those affected by decisions made.

### **3.03 PROGRESS MEETINGS**

- A. Contractor shall make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, Contractor's Project Manager, Contracting Officer, Contracting Officer Representative, Architect, and major Subcontractors/Suppliers when necessary/requested by the Government/Contractor.
  1. A minimum of bi-weekly meetings should be anticipated. More frequent meetings will be scheduled as dictated by the progress and quality of work observed ongoing at the project site. Contractor's project superintendent and project manager shall attend all progress meetings in person.
  2. Additionally, if a third-party project management approach is utilized by the General Contractor, both the third-party project manager and a representative of the General Contractor who is authorized to make decisions regarding project scope, cost, and time shall also be in attendance, in person, at a minimum of one progress meeting each month.
- 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 RFIs log and status of responses.

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. Review of modifications to project record documents documenting changes made on site since previous progress meeting.
  13. Other business relating to work.
- E. Architect will record minutes and distribute copies after meeting to participants, with copies to Architect, Contracting Officer Representative, Contracting Officer, and Contractor. Contractor will be responsible for distributing minutes to suppliers/SubContractor and those affected by decisions made.

### **3.04 CONSTRUCTION PROGRESS SCHEDULE**

- A. Submit proposed project schedule as outlined in the Contract Documents.
- B. General Requirements:
1. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Beneficial Occupancy to date of Final Completion.
  2. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
    - a. Activity Duration: Define activities so no activity is longer than twenty days, unless specifically allowed by the Government.
    - b. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
    - c. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
    - d. Startup and Testing Time: Include not less than seven days for startup and testing.
    - e. Beneficial Occupancy: Indicate completion in advance of date established for Beneficial Occupancy, and allow time for the Government's

administrative procedures necessary for certification of Beneficial Occupancy.

3. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - a. Phasing: Arrange list of activities on schedule by phase.
  - b. Work by the Government: Include a separate activity for each portion of the Work performed by the Government.
  - c. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  - d. Government-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  - e. Work Restrictions: Show the effect of the following items on the schedule:
    - 1) Coordination with existing construction.
    - 2) Limitations of continued occupancies.
    - 3) Uninterruptible services.
    - 4) Partial occupancy before Beneficial Occupancy.
    - 5) Use of premises restrictions.
    - 6) Provisions for future construction.
    - 7) Seasonal variations.
    - 8) Environmental control.
4. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, review inspections by review agencies, Beneficial Occupancy, and Final Completion.
5. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
  - a. Refer to Division 1 Section "Payment Procedures" for cost reporting and payment procedures.

6. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.
- C. Gantt-Chart Schedule:
1. Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within thirty days of date established from the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
  2. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
    - a. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in ten percent increments within time bar.
- D. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate Actual Completion percentage for each activity.
- E. Distribution: Distribute copies of approved schedule to the Government, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

### **3.05 DAILY CONSTRUCTION REPORTS**

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.

- B. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
1. Date.
  2. High and low temperatures, and general weather conditions.
  3. List of subcontractors at Project site.
  4. Approximate count of personnel at Project site.
  5. Safety, environmental, or industrial relations incidents.
  6. Meetings and significant decisions.
  7. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
  8. Testing and/or inspections performed.
  9. Signature of Contractor's authorized representative.

### **3.06 PRE-CONSTRUCTION PHOTOGRAPHS**

- A. Before starting construction, take one hundred color photographs and digital video recording of Project site and affected right-of-ways and surrounding properties and interior existing photos of affected areas from different vantage points, as directed by Government. Show existing conditions adjacent to property.

### **3.07 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 construction throughout progress of Work produced by an experienced photographer, who can also be an employee of the contractor, acceptable to the Government.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
1. Completion of site clearing.
  2. Excavations in progress.
  3. Foundations in progress and upon completion.
  4. Structural framing in progress and upon completion.

5. Enclosure of building, upon completion.
  6. 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 Beneficial Occupancy.
  2. Consult with the Government 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: Via Newforma.
  2. File Naming: Include project identification, date and time of view, and view identification.

### **3.08 SUBMITTALS**

- A. See section 01 3001 - Submittals.

**END OF SECTION**

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**PART I - GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Preparing and processing of submittals for review and action.
  - 2. Preparing and processing of informational submittals.
- B. Submit the following for the Contracting Officer's review and action:
  - 1. Shop drawings.
  - 2. Structural design information required by the contract documents.
  - 3. Product data.
  - 4. Samples.
  - 5. Submittals indicated as "for approval."
  - 6. Submittals for which procedures are not defined elsewhere.
  - 7. Submittal register.
- C. Submit the following as informational submittals:
  - 1. Certificates.
  - 2. Coordination drawings.
  - 3. Reports.
  - 4. Qualification statements for manufacturers/installers.
  - 5. Submittals indicated as "for information only."
- D. Specific submittals required are described in individual sections.
- E. Related Sections: The following are specified elsewhere in Division 1:
  - 1. Product submittals:
    - a. Product option submittals.
    - b. Requests for substitution.
    - c. Operating and maintenance data.
    - d. Warranties.
    - e. Maintenance materials and tools.

2. Contract closeout submittals:
  - a. Equipment and systems demonstration reports.
  - b. Request for determination of Beneficial Occupancy.
  - c. Certificate of occupancy.
  - d. Project record documents.
  - e. Bonds.

## **1.02 DEFINITIONS**

- A. Shop Drawings: See General Conditions.
  1. Shop drawings also include:
    - a. Product data specifically prepared for this project.
    - b. Shop or plant inspection and test reports, when made on specific materials, products, or systems to be used in the work.
- B. Product Data: See General Conditions.
  1. Product data submittals also include:
    - a. Performance curves, when issued by the manufacturer for all products of that type.
    - b. Selection data showing standard colors.
    - c. Wiring diagrams, when standard for all products of that type.
- C. Samples: See General Conditions.
- D. Informational Submittals: Submittals identified in the contract documents as to be submitted for information only.

## **1.03 FORM OF SUBMITTALS**

- A. Use AF Form 3000 as the only acceptable form of approval and transmittal.
  1. Transmit submittal data (including AF Form 3000) electronically. The Architect will provide and maintain an online website electrical submittal database for access by the Government, Architect, and Contractor
  2. Paper format submittals will not be accepted except where specifically approved by the Government prior to submission.
  3. Use of Architect's "Newforma" Website Application:

- a. General Contractor shall use Architect's website software Newforma with access provided by the Architect to conduct all submittal reviews in electronic format.
  - b. All recordkeeping, date stamping, access controls, shall be accomplished and managed by the contractor with access given to the entire project team.
  - c. The software is capable of the following:
    - 1) Markups & notations- marked electronically,
    - 2) Sending submittals - Instant transfer, no maximum size
    - 3) Logging & tracking,
    - 4) Automatic reminders of outstanding items,
    - 5) Central list of all required submittals for project team to work from,
    - 6) Access for all team members to monitor submittal status & progress,
    - 7) Clear version history with record of changes at each step.
  - d. Contractor shall be responsible for any scanning required to upload PDFs.
    - 1) All submittals must bear the stamp of the General Contractor indicating that the General Contractor's personnel have reviewed the submittal for compliance with project requirements prior to uploading the submittal to "Newforma."
  - e. Orientation to the software is available on [Newforma.com](http://Newforma.com) or [Newformant.com](http://Newformant.com).
4. In addition, all RFIs, proposals, pay requests, action items, and electronic document management will be handled thru the Newforma Info Exchange site.
  5. Upon approval of all submittals, the Contractor shall furnish the Government one hard copy of the reviewed submittal complete with all review comments, markups, and a completed AF Form 3000 for project record.
- B. Physical samples: 3 sets of each.
1. 1 set will be returned.
  2. Physical samples shall be sent via mail, overnight delivery, or courier at the Contractor's discretion but be logged into "Newforma" by the Contractor for tracking and reference.
  3. If additional sets are needed by other entities involved in work represented by the samples, submit with original submittal.
  4. Copies in excess of the number requested will not be returned.

C. Submittals for Operation & Maintenance:

1. Provide all submittal data for operation & maintenance in electronic format.
2. In addition to the electronic format, provide two copies of original warranty documentation for all specified warranties.
  - a. Warranty documentation to be 3-hole punched and bound together in a 3 ring binder.
  - b. Warranty documentation should be tabbed and organized by specification section.

**1.04 COORDINATION OF SUBMITTALS**

- A. Coordinate submittals and activities that must be performed in sequence, so that the Contracting Officer and Contracting Officer Representative(s) have enough information to properly review the submittals.
- B. Coordinate submittals of different types for the same product or system so that the Contracting Officer and Contracting Officer Representative(s) have enough information to properly review each submittal.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

**3.01 TIMING OF SUBMITTALS**

- A. Transmit each submittal at or before the time indicated on the approved schedule of submittals.
  1. Prepare and submit for approval a schedule showing the required dates of submittal of all submittals.
  2. Organize the schedule by the applicable specification section number.
  3. Incorporate the contractor's construction schedule specified elsewhere.
  4. Incorporate the quality control activities schedule specified elsewhere.
  5. Submit within 15 days after commencement of the work.
  6. Revise and resubmit the schedule for approval when requested.
- B. Deliver each submittal requiring approval in time to allow for adequate review and processing time, including resubmittals if necessary; failure of the contractor in this respect will not be considered as grounds for an extension of the contract time.
- C. Deliver each informational submittal prior to start of the work involved, unless the submittal is of a type which cannot be prepared until after completion of the work; submit promptly.

- D. If a submittal must be processed within a certain time in order to maintain the progress of the work, state so clearly on the submittal.
- E. If a submittal must be delayed for coordination with other submittals not yet submitted, the Contracting Officer may either return the submittal with no action or notify the contractor of the other submittals which must be received before the submittal can be reviewed.

### **3.02 SUBMITTAL PROCEDURES - GENERAL**

- A. Contractor Review: Sign each copy of each submittal certifying compliance with the requirements of the contract documents.
- B. Notify the Contracting Officer, in writing and at time of submittal, of all points upon which the submittal does not conform to the requirements of the contract documents, if any.
- C. Do not commence work which requires review of any submittals until receipt of returned submittals with an acceptable action.
- D. Do not allow submittals without an acceptable action marking to be used for the project.
- E. Do not submit substitute items that have not been approved by means of the procedure specified elsewhere.
- F. Do not include requests for substitution (either direct or indirect) on submittals; comply with procedures for substitutions specified elsewhere.
- G. Preparation of Submittals:
  - 1. Label each copy of each submittal, with the following information:
    - a. Project name.
    - b. Date of submittal.
    - c. Contractor's name and address.
    - d. Architect's name and address.
    - e. Subcontractor's name and address.
    - f. Supplier's name and address.
    - g. Manufacturer's name.
    - h. Specification section where the submittal is specified.
    - i. Numbers of applicable drawings and details.
    - j. Other necessary identifying information.

- k. Indicate whether manufacturer or other source is listed on the Government's preferred vendor list.
  - l. Use AF Form 3000 for the approval of submittal.
  2. When applicable, pack submittals suitably for shipment.
  3. Submittals to receive Contracting Officer's action marking: Provide blank space on the label or on the submittal itself for action marking; minimum 4 inches wide by 5 inches high.
- H. Transmittal of Submittals:
1. Submit all submittals to the Government.
  2. Submittals will be accepted from the contractor only. Submittals received from other entities will be returned without review or action.
  3. Submittals received without a transmittal form will be returned without review or action.
    - a. Project name.
    - b. Submittal date.
    - c. Transmittal number.
    - d. Specification section number.
    - e. To:
    - f. From:
    - g. Contractor's name.
    - h. Subcontractor's and supplier's names.
    - i. Manufacturer's name.
    - j. Submittal type (shop drawing, product data, sample, informational submittal).
    - k. Description of submittal.
    - l. Records of distribution.
    - m. Action marking.
    - n. Comments.
  4. Fill out a separate transmittal form for each submittal; also include the following:

- a. Other relevant information.
  - b. Requests for additional information.
- I. NOTE ADDITIONAL INFORMATION ON RESUBMITTALS. In the event a re-submittal is required one re-submittal will be processed at no charge to the contractor.

### **3.03 SHOP DRAWINGS**

- A. Content: Include the following information:
1. Dimensions, at accurate scale.
  2. All field measurements that have been taken, at accurate scale.
  3. Names of specific products and materials used.
  4. Details, identified by contract document sheet and detail numbers.
  5. Show compliance with the specific standards referenced.
  6. Coordination requirements; show relationship to adjacent or critical work.
  7. Name of preparing firm.
- B. Preparation:
1. Reproductions of contract documents are not acceptable as shop drawings.
  2. Copies of standard printed documents are not acceptable as shop drawings.
  3. Identify as indicated for all submittals.
  4. Space for Contracting Officer's action marking shall be adjacent to the title block.

### **3.04 PRODUCT DATA**

- A. When product data submittals are prepared specifically for this project (in the absence of standard printed information) submit such information as shop drawings and not as product data submittals.
- B. Content:
1. Submit manufacturer's standard printed data sheets.
  2. Identify the particular product being submitted; submit only pertinent pages.
  3. Show compliance with properties specified.
  4. Identify which options and accessories are applicable.

5. Include recommendations for application and use.
6. Show compliance with the specific standards referenced.
7. Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
8. Identify dimensions which have been verified by field measurement.
9. Show special coordination requirements for the product.

### **3.05 SAMPLES**

**A. Samples:**

1. Provide samples that are the same as proposed product.

**B. Preparation:**

1. Attach a description to each sample.
2. Attach name of manufacturer or source to each sample.
3. Where compliance with specified properties is required, attach documentation showing compliance.
4. Where there are limitations in availability, delivery, or other similar characteristics, attach description of such limitations.

### **3.06 REVIEW OF SUBMITTALS**

- A.** Submittals for approval will be reviewed, marked with appropriate action, and returned.
- B.** Informational submittals: Submittals will be reviewed.
1. "X" action: No action taken.
  2. "Not Approved" action: Revise the submittal or prepare a new submittal complying with the comments made.

### **3.07 RETURN, RESUBMITTAL, AND DISTRIBUTION**

- A.** Submittals will be returned via the Newforma website.
- B.** Perform resubmittals in the same manner as original submittals; indicate all changes other than those requested by the Contracting Officer.
- C.** Distribution:
1. Distribute returned submittals to all subcontractors and suppliers involved in work covered by the submittal.

2. Record distribution on transmittal form.

### **3.08 SUBMITTAL REGISTER**

- A. Contractor to provide a register of submittals required under this contract. Register to include information as shown in sample register at the end of this section.

**END OF SECTION 01 3001**

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SCHEDULE OF MATERIAL SUBMITTALS										PROJECT NUMBER FAKZ999088 / 182356		PROJECT TITLE BASE SUPPLY COMPLEX / DSP TO BE COMPLETED BY CONTRACT ADMINISTRATOR		SOLICITATION/CONTRACT NO. <CONTRACT #>								
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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED						
	<b>Division 1 - General Requirements</b>																					
1	Section 01 0450, Cutting and Patching, Cutting & Patching Proposal																					
2	Section 01 0500, Field Engineering, Certificates	D																				
3	Section 01 0500, Field Engineering, Record Documents																					
4	Section 01 0500, Field Engineering, Dig Permit																					
5	Section 01 2000, Price and Payment Procedures, Schedule of Values																					
6	Section 01 3000, Administrative Requirements, Project Manager Resume																					
7	Section 01 3000, Administrative Requirements, Superintendent Resume																					
8	Section 01 3000, Administrative Requirements, Construction Quality Control Resume																					
9	Section 01 3000, Administrative Requirements, Proposed Schedule																					
10	Section 01 3000, Administrative Requirements, Pre-Construction Photos																					
11	Section 01 3000, Administrative Requirements, List of Subcontractors																					
12	Section 01 3000, Administrative Requirements, Initial Submittal Schedule																					
13	Section 01 3001, Submittals, Submittal Register																					
14	Section 01 3225, Project Sustainability Summary, Final Commissioning Report																					
15	Section 01 3329, Sustainable Design Reporting, HPSB Checklist																					
16	Section 01 4000, Quality Requirements, Testing Agency Qualifications	D																				
17	Section 01 5460, Safety and Health, Site Specific Safety and Quality Control Plan																					
18	Section 01 5460, Safety and Health, Hazardous Material Certificates/Permits	D																				
19	Section 01 5460, Safety and Health, Accident Report																					
20	Section 01 5719, Temporary Environmental Controls, Management Plan	D																				
21	Section 01 5719, Temporary Environmental Controls, Finish Installation Schedule	D																				
22	Section 01 5719, Temporary Environmental Controls, Duct and Terminal Unit Inspection Report																					
23	Section 01 5719, Temporary Environmental Controls, Air Containment Test Plan and Report	D																				
24	Section 01 5719, Temporary Environmental Controls, Ventilation Effectiveness Plan and Test Reports	D																				
25	Section 01 5719, Temporary Environmental Controls, IAQ Management Report																					

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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT			APPROVED	DIS-APPROVED				
26	Section 01 7000, Execution and Closeout Requirements, Surveyor Qualifications																		
27	Section 01 7000, Execution and Closeout Requirements, Site Drawing																		
28	Section 01 7000, Execution and Closeout Requirements, Demolition Plan																		
29	Section 01 7000, Execution and Closeout Requirements, Demolition Firm Qualifications																		
30	Section 01 7000, Execution and Closeout Requirements, Surveyor Errors & Omissions Coverage																		
31	Section 01 7000, Execution and Closeout Requirements, Record Documents																		
32	Section 01 7419, Construction Waste Management and Disposal, Waste Management Plan																		
33	Section 01 7419, Construction Waste Management and Disposal, Waste Disposal Reports																		
34	Section 01 7600, Closeout Submittals, Project Record Drawings																		
35	Section 01 7600, Closeout Submittals, Project Record Specifications																		
36	Section 01 7600, Closeout Submittals, Project Record Addenda																		
37	Section 01 7600, Closeout Submittals, Project Record Change Orders																		
38	Section 01 7600, Closeout Submittals, Project Record Reviewed Shop Drawings																		
39	Section 01 7600, Closeout Submittals, Project Record Manufacturer's Installation Instructions																		
40	Maintenance Data																		
41	Section 01 7600, Closeout Submittals, Project Record Care & Maintenance Data																		
42	Section 01 7600, Closeout Submittals, Project Warranties & Bonds																		
43	Section 01 7600, Closeout Submittals, Project Attic Stock/Extra Materials																		
44	Section 01 7900, Demonstration and Training, Draft Training Plans																		
45	Section 01 7900, Demonstration and Training, Training Manuals																		
46	Section 01 7900, Demonstration and Training, Training Reports																		
47	Section 01 7900, Demonstration and Training, Video Recordings																		
48	Section 01 9113 - General Commissioning Requirements, Commissioning Plan																		
49	Section 01 9113 - General Commissioning Requirements, Start Up Plan																		
50	Section 01 9113 - General Commissioning Requirements, Start Up Report																		
51	Section 01 9113 - General Commissioning Requirements, Prefunctional Checklists																		

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		NO. OF COPIES REQUIRED										APPROVED	DIS-APPROVED					
52	Section 01 9113 - General Commissioning Requirements, Commissioning Schedule																	
	<b>Division 2 - Existing Conditions</b>																	
53	Section 02 4100, Demolition, Site Plan																	
54	Section 02 4100, Demolition, Demolition Plan																	
55	Section 02 4100, Demolition, Record Documents																	
56	Section 02 4100, Demolition, Demolition Firm Qualifications																	
	<b>Division 3 - Concrete - Concrete</b>																	
57	Section 03 3000, Cast-In-Place Concrete, Product Data																	
58	Section 03 3000, Cast-In-Place Concrete, Samples		3															
59	Section 03 3000, Cast-In-Place Concrete, Test Reports																	
60	Section 03 3000, Cast-In-Place Concrete, Manufacturer's Installation Instructions																	
61	Section 03 3000, Cast-In-Place Concrete, Sustainable Design Submittal																	
62	Section 03 3000, Cast-In-Place Concrete, Project Record Documents																	
63	Section 03 3000, Cast-In-Place Concrete, Material Test Reports																	
64	Section 03 3000, Cast-In-Place Concrete, Material Certificates																	
65	Section 03 3000, Cast-In-Place Concrete, Formwork Shop Drawings																	
66	Section 03 3000, Cast-In-Place Concrete, Steel Reinforcement Shop Drawings																	
67	Section 03 3000, Cast-In-Place Concrete, Design Mix																	
68	Section 03 3000, Cast-In-Place Concrete, Installer Qualifications																	
69	Section 03 3000, Cast-In-Place Concrete, Manufacturer Qualifications																	
70	Section 03 3000, Cast-In-Place Concrete, Testing Agency Qualifications																	
	<b>Division 4 - Masonry</b>																	
71	Section 04 2000, Unit Masonry, Product Data																	
72	Section 04 2000, Unit Masonry, Samples		3															
73	Section 04 2000, Unit Masonry, Manufacturer's Certificate																	
74	Section 04 2000, Unit Masonry, Sustainability Submittals																	
	<b>Division 5 - Metals</b>																	
75	Section 05 1200, Structural Steel Framing, Shop Drawings																	
76	Section 05 1200, Structural Steel Framing, Mill Certificates																	
77	Section 05 1200, Structural Steel Framing, Sustainability Submittals																	
78	Section 05 1200, Structural Steel Framing, Fabricator Qualification Data																	
79	Section 05 1200, Structural Steel Framing, Erector Qualification Data																	

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80	Section 05 1200, Structural Steel Framing, Sustainability Submittals																				
81	Section 05 2100, Steel Joist Framing, Shop Drawings	D																			
82	Section 05 2100, Steel Joist Framing, Welder's Certificates																				
83	Section 05 2100, Steel Joist Framing, Erector Qualifications	D																			
84	Section 05 2100, Steel Joist Framing, Sustainability Submittals																				
85	Section 05 3100, Steel Decking, Shop Drawings	D																			
86	Section 05 3100, Steel Decking, Product Data																				
87	Section 05 3100, Steel Decking, Certificates	D																			
88	Section 05 3100, Steel Decking, Installation Instructions				D																
89	Section 05 3100, Steel Decking, Welder's Certificates	D																			
90	Section 05 3100, Steel Decking, Sustainability Submittals																				
91	Section 05 3100, Steel Decking, Installer Qualifications																				
92	Section 05 4000, Cold Formed Metal Framing, Product Data																				
93	Section 05 4000, Cold Formed Metal Framing, Shop Drawings	D																			
94	Section 05 4000, Cold Formed Metal Framing, Manufacturer's Installation Instructions				D																
95	Section 05 4000, Cold Formed Metal Framing, Sustainability Submittals																				
96	Section 05 4000, Cold Formed Metal Framing, Manufacturer Qualification	D																			
97	Section 05 4000, Cold Formed Metal Framing, Installer Qualifications	D																			
98	Section 05 5000, Metal Fabrications, Shop Drawings		D																		
99	Section 05 5000, Metal Fabrications, Welder's Certificates	D																			
100	Section 05 5000, Metal Fabrications, Sustainability Submittal																				
101	Section 05 5000, Metal Fabrications, Fabricator Qualifications Sustainability Submittal	D																			
	<b>Division 6 - Wood, Plastics, and Composites</b>																				
102	Section 06 1000, Rough Carpentry, Product Data																				
103	Section 06 1000, Rough Carpentry, Sustainability Submittal																				
	<b>Division 7 - Thermal &amp; Moisture Protection</b>																				
104	Section 07 0100, Special Project Roofing Warranty, Warranty																				
105	Section 07 2100, Thermal Insulation, Product Data																				
106	Section 07 2100, Thermal Insulation, Manufacturer's Installation Instructions				D																
107	Section 07 2100, Thermal Insulation, VOC Content Limitation Documentation																				
108	Section 07 2100, Thermal Insulation, Sustainability Submittal																				
109	Section 07 2500, Weather Barriers, Product Data																				

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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED					
110	Section 07 2500, Weather Barriers, Shop Drawings	D																			
111	Section 07 2500, Weather Barriers, Samples			3																	
112	Section 07 2500, Weather Barriers, Certificates	D																			
113	Section 07 2500, Weather Barriers, Qualification Data	D																			
114	Section 07 2500, Weather Barriers, Test Reports																				
115	Section 07 2500, Weather Barriers, Manufacturer's Warranty																				
116	Section 07 2500, Weather Barriers, Project Air Barrier Warranty																				
117	Section 07 4114, Insulated Metal Roof Panels, Manufacturer's Qualifications	D																			
118	Section 07 4114, Insulated Metal Roof Panels, Installer's Qualifications	D																			
119	Section 07 4114, Insulated Metal Roof Panels, Product Data																				
120	Section 07 4114, Insulated Metal Roof Panels, Shop Drawings	D																			
121	Section 07 4114, Insulated Metal Roof Panels, Samples			3																	
122	Section 07 4114, Insulated Metal Roof Panels, Warranty																				
123	Section 07 4114, Insulated Metal Roof Panels, Sustainability Submittals																				
124	Section 07 4214, Insulated Metal Wall Panels, Product Data																				
125	Section 07 4214, Insulated Metal Wall Panels, Shop Drawings	D																			
126	Section 07 4214, Insulated Metal Wall Panels, Samples			3																	
127	Section 07 4214, Insulated Metal Wall Panels, Design and Performance Data																				
128	Section 07 4214, Insulated Metal Wall Panels, Manufacturer's Installation Instructions																				
129	Section 07 4214, Insulated Metal Wall Panels, Installer Qualifications	D																			
130	Section 07 4214, Insulated Metal Wall Panels, Manufacturer's Qualifications	D																			
131	Section 07 4214, Insulated Metal Wall Panels, Warranty																				
132	Section 07 4214, Insulated Metal Wall Panels, Sustainability Submittals																				
133	Section 07 4293, Metal Soffit Panels, Manufacturer Qualification	D																			
134	Section 07 4293, Metal Soffit Panels, Installer Qualification	D																			
135	Section 07 4293, Metal Soffit Panels, Product Test Report																				
136	Section 07 4293, Metal Soffit Panels, Product Data																				
137	Section 07 4293, Metal Soffit Panels, Shop Drawings	D																			
138	Section 07 4293, Metal Soffit Panels, Samples			3																	
139	Section 07 4293, Metal Soffit Panels, Test Reports																				
140	Section 07 4293, Metal Soffit Panels, Manufacturer Warranty																				
141	Section 07 4293, Metal Soffit Panels, Sustainability Submittal																				

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142	Section 07 4293, Metal Soffit Panels, Closeout Submittal																					
143	Section 07 6200, Sheet Metal Flashing and Trim, Shop Drawings		D																			
144	Section 07 6200, Sheet Metal Flashing and Trim, Samples			3																		
145	Section 07 6200, Sheet Metal Flashing and Trim, Sustainability Submittals																					
146	Section 07 6200, Sheet Metal Flashing and Trim, Fabricator and Installer Qualifications		D																			
147	Section 07 6200, Sheet Metal Flashing and Trim, Flashing Warranty																					
148	Section 07 6200, Sheet Metal Flashing and Trim, ES-1 Verification		D																			
149	Section 07 6500, Wall Flashing, Product Data																					
150	Section 07 6500, Wall Flashing, Shop Drawings		D																			
151	Section 07 6500, Wall Flashing, Test Reports																					
152	Section 07 6500, Wall Flashing, Samples			3																		
153	Section 07 6500, Wall Flashing, Warranty																					
154	Section 07 7100, Roof Specialties, Product Data																					
155	Section 07 7100, Roof Specialties, Samples			3																		
156	Section 07 7100, Roof Specialties, Shop Drawings		D																			
157	Section 07 7100, Roof Specialties, Sustainability Submittals																					
158	Section 07 7100, Roof Specialties, Manufacturer Qualification Data																					
159	Section 07 7100, Roof Specialties, Product Certificates		D																			
160	Section 07 7100, Roof Specialties, Product Test Report																					
161	Section 07 7100, Roof Specialties, Sample Warranty																					
162	Section 07 7100, Roof Specialties, Closeout Submittal																					
163	Section 07 8400 - Firestopping, Product Data																					
164	Section 07 8400 - Firestopping, Schedule of Firestopping																					
165	Section 07 8400 - Firestopping, Manufacturer's Installation Instructions																					
166	Section 07 8400 - Firestopping, Manufacturer's Certificates		D																			
167	Section 07 8400 - Firestopping, VOC Content Limitations																					
168	Section 07 8400 - Firestopping, Sustainability Submittals																					
169	Section 07 8400 - Firestopping, Manufacturer Qualifications		D																			
170	Section 07 8400 - Firestopping, Installer Qualifications		D																			
171	Section 07 9005, Joint Sealers, Product Data																					
172	Section 07 9005, Joint Sealers, Samples			3																		
173	Section 07 9005, Joint Sealers, Manufacturer's Sample Warranty																					

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174	Section 07 9005, Joint Sealers, Installation Instructions																				
175	Section 07 9005, Joint Sealers, Manufacturer Qualifications	D																			
176	Section 07 9005, Joint Sealers, Applicator Qualifications	D																			
177	Section 07 9005, Joint Sealers, Sustainability Submittal																				
178	Section 07 9005, Joint Sealers, Warranty																				
	<b>Division 8 - Openings</b>																				
179	Section 08 1113, Hollow Metal Doors and Frames, Product Data																				
180	Section 08 1113, Hollow Metal Doors and Frames, Shop Drawings		D																		
181	Section 08 1113, Hollow Metal Doors and Frames, Installation Instructions																				
182	Section 08 1113, Hollow Metal Doors and Frames, Sustainability Submittals																				
183	Section 08 1113, Hollow Metal Doors and Frames, Manufacturer Qualification	D																			
184	Section 08 3100, Access Doors and Panels, Product Data																				
185	Section 08 3100, Access Doors and Panels, Shop Drawings		D																		
186	Section 08 3100, Access Doors and Panels, Manufacturer's Installation Instructions.																				
187	Section 08 3100, Access Doors and Panels, Sustainability Submittal																				
188	Section 08 3323, Overhead Coiling Doors, Product Data																				
189	Section 08 3323, Overhead Coiling Doors, Shop Drawings		D																		
190	Section 08 3323, Overhead Coiling Doors, Manufacturer's Instructions																				
191	Section 08 3323, Overhead Coiling Doors, Maintenance Data																				
192	Section 08 3323, Overhead Coiling Doors, Sustainability Submittals																				
193	Section 08 4313, Aluminum Framed Storefronts, Product Data																				
194	Section 08 4313, Aluminum Framed Storefronts, Shop Drawings		D																		
195	Section 08 4313, Aluminum Framed Storefronts, Hardware Schedule																				
196	Section 08 4313, Aluminum Framed Storefronts, Samples																				
197	Section 08 4313, Aluminum Framed Storefronts, Warranty																				
198	Section 08 4313, Aluminum Framed Storefronts, Sustainability Submittals																				
199	Section 08 4313, Aluminum Framed Storefronts, Manufacturer Qualifications	D																			
200	Section 08 4313, Aluminum Framed Storefronts, Installer Qualification	D																			
201	Section 08 8800, Glazing, Product Data																				
202	Section 08 8800, Glazing, Samples																				
203	Section 08 8800, Glazing, Installer Qualifications																				
204	Section 08 9100, Louvers, Product Data																				

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205	Section 08 9100, Louvers, Shop Drawings	D												NTP + 21 DAYS							
206	Section 08 9100, Louvers, Samples			3										NTP + 21 DAYS							
207	Section 08 9100, Louvers, Test Reports													NTP + 21 DAYS							
208	Section 08 9100, Louvers, Manufacturer's Certificate	D												NTP + 21 DAYS							
209	Section 08 9100, Louvers, Maintenance Data													NTP + 21 DAYS							
210	Section 08 9100, Louvers, Sustainability Submittals													NTP + 21 DAYS							
211	Section 08 9100, Louvers, Sample Warranty													NTP + 21 DAYS							
212	Section 08 9100, Louvers, Manufacturer Qualifications	D												NTP + 21 DAYS							
<b>Division 9 - Finishes</b>																					
213	Section 09 0561, Common Work Results for Flooring Preparation, Testing Agency Report													NTP + 21 DAYS							
214	Section 09 6500, Resilient Base, Product Data													NTP + 21 DAYS							
215	Section 09 6500, Resilient Base, Selection Samples			3										NTP + 21 DAYS							
216	Section 09 6500, Resilient Base, Sustainability Submittals													NTP + 21 DAYS							
217	Section 09 6500, Resilient Base, Maintenance Data													NTP + 21 DAYS							
218	Section 09 6500, Resilient Base, Maintenance Materials													END OF CONTRACT							
219	Section 09 6500, Resilient Base, Installer Qualifications	D												NTP + 21 DAYS							
220	Section 09 9113, Exterior Painting, Product Data													NTP + 21 DAYS							
221	Section 09 9113, Exterior Painting, Samples			3										NTP + 21 DAYS							
222	Section 09 9113, Exterior Painting, Manufacturer's Certification	D												NTP + 21 DAYS							
223	Section 09 9113, Exterior Painting, Manufacturer's Instructions													NTP + 21 DAYS							
224	Section 09 9113, Exterior Painting, Maintenance Data													NTP + 21 DAYS							
225	Section 09 9113, Exterior Painting, Maintenance Material													END OF CONTRACT							
226	Section 09 9113, Exterior Painting, Manufacturer Qualifications	D												NTP + 21 DAYS							
227	Section 09 9113, Exterior Painting, Applicator Qualifications	D												NTP + 21 DAYS							
228	Section 09 9123, Interior Painting, Product Data													NTP + 21 DAYS							
229	Section 09 9123, Interior Painting, Samples			3										NTP + 21 DAYS							
230	Section 09 9123, Interior Painting, Manufacturer's Certification	D												NTP + 21 DAYS							
231	Section 09 9123, Interior Painting, Manufacturer's Instructions													NTP + 21 DAYS							
232	Section 09 9123, Interior Painting, Sustainability Submittals													NTP + 21 DAYS							
233	Section 09 9123, Interior Painting, Maintenance Data													NTP + 21 DAYS							
234	Section 09 9123, Interior Painting, Maintenance Materials													END OF CONTRACT							
235	Section 09 9123, Interior Painting, Manufacturer Qualifications	D												NTP + 21 DAYS							
236	Section 09 9123, Interior Painting, Applicator Qualifications	D												NTP + 21 DAYS							
<b>Division 10 - Specialties</b>																					

SCHEDULE OF MATERIAL SUBMITTALS										PROJECT NUMBER FAKZ999088 / 182356		PROJECT TITLE BASE SUPPLY COMPLEX / DSP		SOLICITATION/CONTRACT NO. <CONTRACT #>			
TO BE COMPLETED BY PROJECT MANAGER										TO BE COMPLETED BY CONTRACT ADMINISTRATOR							
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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT \ REPORT			
237	Section 10 1400, Signage, Product Data																
238	Section 10 1400, Signage, Signage Schedule		D														
239	Section 10 1400, Signage, Samples			3													
240	Section 10 1400, Signage, Installation Instructions				D												
241	Section 10 1400, Signage, Maintenance Materials																
242	Section 10 1400, Signage, Sustainability Submittals																
243	Section 10 1400, Signage, Selection Samples																
244	Section 10 1400, Signage, Manufacturer Qualifications		D														
245	Section 10 4400, Fire Protection Specialties, Manufacturer's Installation Instructions				D												
246	Section 10 4400, Fire Protection Specialties, Maintenance Data																
247	Section 10 4400, Fire Protection Specialties, Sustainability Submittals																
248	Section 10 8500, Recycling Specialties, Product Data																
249	<b>Division 13 - Special Construction</b>																
249	Section 13 3419, Metal Building Systems, Product Data																
250	Section 13 3419, Metal Building Systems, Shop Drawings		D														
251	Section 13 3419, Metal Building Systems, Manufacturer Qualifications		D														
252	Section 13 3419, Metal Building Systems, Manufacturer's Instructions																
253	Section 13 3419, Metal Building Systems, Project Record Documents																
254	Section 13 3419, Metal Building Systems, Product Certificates		D														
255	Section 13 3419, Metal Building Systems, Welding Certificates		D														
256	Section 13 3419, Metal Building Systems, Erector Certificates		D														
257	Section 13 3419, Metal Building Systems, Test Reports																
258	Section 13 3419, Metal Building Systems, Sustainability Submittals																
259	Section 13 3419, Metal Building Systems, Designer Qualifications		D														
	<b>Division 21 - Fire Protection</b>																
260	Section 21 1313, Wet Pipe Sprinkler System, Product Data																
261	Section 21 1313, Wet Pipe Sprinkler System, Shop Drawings		D														
262	Section 21 1313, Wet Pipe Sprinkler System, Coordination Drawings		D														
263	Section 21 1313, Wet Pipe Sprinkler System, Water Flow Test Report																
264	Section 21 1313, Wet Pipe Sprinkler System, Field Quality Control Reports																
265	Section 21 1313, Wet Pipe Sprinkler System, Field Test Report																
266	Section 21 1313, Wet Pipe Sprinkler System, Operation & Maintenance Data																

SCHEDULE OF MATERIAL SUBMITTALS											PROJECT NUMBER FAKZ999088 / 182356		PROJECT TITLE BASE SUPPLY COMPLEX / DSP		SOLICITATION/CONTRACT NO. <CONTRACT #>					
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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED				
	<b>Division 22 - Plumbing</b>																			
267	Section 22 0514, Common Work Results for Plumbing, Welding Certificates	D												NTP + 21 DAYS						
268	Section 22 0514, Common Work Results for Plumbing, Shop Drawings	D												NTP + 21 DAYS						
269	Section 22 0529, Hangars and Supports for Plumbing Piping and Equipment, Product Data	D												NTP + 21 DAYS						
270	Section 22 0529, Hangars and Supports for Plumbing Piping and Equipment, Shop Drawings	D												NTP + 21 DAYS						
271	Section 22 0529, Hangars and Supports for Plumbing Piping and Equipment, Welding Certificates	D												NTP + 21 DAYS						
272	Section 22 0716, Plumbing Piping Insulation, Product Data											D		NTP + 21 DAYS						
273	Section 22 0716, Plumbing Piping Insulation, Shop Drawings	D												NTP + 21 DAYS						
274	Section 22 0716, Plumbing Piping Insulation, Field Quality-Control Reports											D		NTP + 21 DAYS						
275	Section 22 1000, Facility Natural Gas Piping, Product Data											D		NTP + 21 DAYS						
276	Section 22 1000, Facility Natural Gas Piping, Shop Drawings	D												NTP + 21 DAYS						
277	Section 22 1000, Facility Natural Gas Piping, Welding Certificates	D												NTP + 21 DAYS						
278	Section 22 1000, Facility Natural Gas Piping, Field quality Control Reports											D		NTP + 21 DAYS						
279	Section 22 1000, Facility Natural Gas Piping, Operation and Maintenance Data										D			NTP + 21 DAYS						
280	Section 22 1116, Domestic Water Piping Specialties, Product Data											D		NTP + 21 DAYS						
281	Section 22 1116, Domestic Water Piping Specialties, Field Quality-Control Test Reports											D		NTP + 21 DAYS						
282	Section 22 1119, Domestic Water Piping Specialties, Product Data											D		NTP + 21 DAYS						
283	Section 22 1119, Domestic Water Piping Specialties, Field Quality-Control Test Reports											D		NTP + 21 DAYS						
284	Section 22 1119, Domestic Water Piping Specialties, Operation and Maintenance Data										D			NTP + 21 DAYS						
285	Section 22 1316, Sanitary Waste and Vent Piping, Field Quality-Control Inspection and Test Reports											D		NTP + 21 DAYS						
286	Section 22 1319, Sanitary Waste Piping Specialties, Product Data											D		NTP + 21 DAYS						
	<b>Division 23 - Heating, Ventilating, &amp; Air Conditioning (HVAC)</b>																			

SCHEDULE OF MATERIAL SUBMITTALS											PROJECT NUMBER FAKZ999088 / 182356		PROJECT TITLE BASE SUPPLY COMPLEX / DSP TO BE COMPLETED BY CONTRACT ADMINISTRATOR			SOLICITATION/CONTRACT NO. -CONTRACT #-						
LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL	NO. OF COPIES REQUIRED										RETURN SUSPENSE DATE	DATE TO CIVIL ENGINEERING	REQUIRED SUBMISSION DATE	DATE CONTRACTOR NOTIFIED		CONTRACTOR RESUBMITTAL	FINAL APPROVAL	REMARKS			
		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED						
287	Section 23 0518, Escutcheons for HVAC Piping, Product Data																					
288	Section 23 0529, Hangars and Supports for HVAC Piping and Equipment, Product Data																					
289	Section 23 0553, Identification for Piping and Equipment, Product Data																					
290	Section 23 0593, Testing Adjusting and Balancing, Qualification Data																					
291	Section 23 0593, Testing Adjusting and Balancing, Certified TAB Reports																					
292	Section 23 0593, Testing Adjusting and Balancing for HVAC, Sample Report Forms																					
293	Section 23 0593, Testing Adjusting and Balancing for HVAC, Instrument Calibration Reports																					
294	Section 23 0719, HVAC Piping Insulation, Product Data																					
295	Section 23 0719, HVAC Piping Insulation, Shop Drawings		D																			
296	Section 23 0900, HVAC Instrumentation and Controls, Shop Drawings		D																			
297	Section 23 0900, HVAC Instrumentation and Controls, Product Data																					
298	Section 23 0900, HVAC Instrumentation and Controls, Schedule																					
299	Section 23 0900, HVAC Instrumentation and Controls, Record Documents																					
300	Section 23 0900, HVAC Instrumentation and Controls, Training Materials																					
301	Section 23 3113, Metal Ducts, Product Data																					
302	Section 23 3113, Metal Ducts, Shop Drawings		D																			
303	Section 23 3113, Metal Ducts, Coordination Drawings																					
304	Section 23 3113, Metal Ducts, Field Quality Control Reports																					
305	Section 23 3300, Duct Accessories, Product Data																					
306	Section 23 3300, Duct Accessories, Shop Drawings		D																			
307	Section 23 3300, Duct Accessories, Coordination Drawings																					
308	Section 23 3300, Duct Accessories, Operation and Maintenance Data																					
309	Section 23 3301, Fixed Louvers, Product Data																					
310	Section 23 3301, Fixed Louvers, Shop Drawings		D																			
311	Section 23 3301, Fixed Louvers, Samples			D																		
312	Section 23 3301, Fixed Louvers, Test Reports																					
313	Section 23 3400, HVLS Fans, Product Data																					
314	Section 23 3400, HVLS Fans, Shop Drawings		D																			
315	Section 23 3423, HVAC Power Ventilators, Product Data																					
316	Section 23 3423, HVAC Power Ventilators, Shop Drawings		D																			

SCHEDULE OF MATERIAL SUBMITTALS												PROJECT NUMBER		PROJECT TITLE		SOLICITATION/CONTRACT NO.				
TO BE COMPLETED BY PROJECT MANAGER												FAKZ999088 / 182356		BASE SUPPLY COMPLEX / DSP		<CONTRACT #>				
LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL	NO. OF COPIES REQUIRED										RETURN SUSPENSE DATE	DATE TO CIVIL ENGINEERING	REQUIRED SUBMISSION DATE	DATE CONTRACTOR NOTIFIED		CONTRACTOR RESUBMITTAL	FINAL APPROVAL	REMARKS	
		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED				
317	Section 23 3423, HVAC Power Ventilators, Operation and Maintenance Materials																			
318	Section 23 5100, HVAC Breechings, Product Data	D																		
319	Section 23 5100, HVAC Breechings, Shop Drawings		D																	
320	Section 23 5100, HVAC Breechings, Certificates	D																		
321	Section 23 5533, Gas-Fired Unit Heaters, Product Data																			
322	Section 23 5533, Gas-Fired Unit Heaters, Shop Drawings		D																	
323	Section 23 5533, Gas-Fired Unit Heaters, Operation and Maintenance Data																			
	<b>Division 26 - Electrical</b>																			
324	Section 26 0100, General Items, Coordination Certification	D																		
325	Section 26 0519, Low-Voltage Electrical Power Conductors and Cables, Product Data																			
326	Section 26 0519, Low-Voltage Electrical Power Conductors and Cables, Field Quality Control Reports																			
327	Section 26 0526, Grounding and Bonding for Electrical Systems, Product Data																			
328	Section 26 0526, Grounding and Bonding for Electrical Systems, Field Quality Control Reports																			
329	Section 26 0529, Hangers and Supports for Electrical Systems, Product Data																			
330	Section 26 0529, Hangers and Supports for Electrical Systems, Shop Drawings		D																	
331	Section 26 0529, Hangers and Supports for Electrical Systems, Welding Certificates	D																		
332	Section 26 0533, Raceways and Boxes, Product Data																			
333	Section 26 0533, Raceways and Boxes, Shop Drawings		D																	
334	Section 26 0533, Raceways and Boxes, Coordination Drawings																			
335	Section 26 0543, Underground Ducts and Raceways for Electrical, Product Data																			
336	Section 26 0543, Underground Ducts and Raceways for Electrical, Shop Drawings		D																	
337	Section 26 0543, Underground Ducts and Raceways for Electrical, Coordination Drawings																			
338	Section 26 0543, Underground Ducts and Raceways for Electrical, Certificates																			

SCHEDULE OF MATERIAL SUBMITTALS										PROJECT NUMBER FAK2999088 / 182356		PROJECT TITLE BASE SUPPLY COMPLEX / DSP		SOLICITATION/CONTRACT NO. <CONTRACT #>							
TO BE COMPLETED BY PROJECT MANAGER										TO BE COMPLETED BY CONTRACT ADMINISTRATOR											
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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED					
339	Section 26 0543, Underground Ducts and Raceways for Electrical, Qualifications	D																			
340	Section 26 0543, Underground Ducts and Raceways for Electrical, Quality Control Reports																				
341	Section 26 0543, Underground Ducts and Raceways for Electrical, Testing Agency Qualifications	D																			
341	Section 26 0544, Sleeves and Sleeve Seals for Electrical Raceways and Cabling, Product Data																				
342	Section 26 0544, Sleeves and Sleeve Seals for Electrical Raceways and Cabling, Sustainability Submittals																				
343	Section 26 0553, Identification for Electrical Systems, Product Data																				
344	Section 26 0923, Lighting Control System, Shop Drawings																				
345	Section 26 0923, Lighting Control System, Product Data																				
346	Section 26 2416, Panelboards, Product Data																				
347	Section 26 2416, Panelboards, Shop Drawings																				
348	Section 26 2416, Panelboards, Certificates																				
349	Section 26 2416, Panelboards, Field Quality Control Reports																				
350	Section 26 2416, Panelboards, Panelboard Schedules																				
351	Section 26 2416, Panelboards, Operation and Maintenance Data																				
352	Section 26 2418, Low-Voltage Transformers, Product Data																				
353	Section 26 2418, Low-Voltage Transformers, Shop Drawings																				
354	Section 26 2418, Low-Voltage Transformers, Certificates																				
355	Section 26 2418, Low-Voltage Transformers, Field Quality Control Report																				
356	Section 26 2418, Low-Voltage Transformers, Operation and Maintenance																				
357	Section 26 2727, Wiring Devices, Product Data																				
358	Section 26 2727, Wiring Devices, Shop Drawings																				
359	Section 26 2727, Wiring Devices, Field Quality Control Reports																				
360	Section 26 2727, Wiring Devices, Operation and Maintenance Data																				
361	Section 26 2813, Fuses, Product Data																				
362	Section 26 2813, Fuses, Operation and Maintenance Data																				
363	Section 26 2816, Enclosed Switches and Circuit Breakers, Product Data																				
364	Section 26 2816, Enclosed Switches and Circuit Breakers, Shop Drawings																				

SCHEDULE OF MATERIAL SUBMITTALS													PROJECT NUMBER FAKZ999088 / 182356			PROJECT TITLE BASE SUPPLY COMPLEX / DSP TO BE COMPLETED BY CONTRACT ADMINISTRATOR			SOLICITATION/CONTRACT NO. <CONTRACT #>		
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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED					
365	Section 26 2816, Enclosed Switches and Circuit Breakers, Certificates	D											NTP + 21 DAYS								
366	Section 26 2816, Enclosed Switches and Circuit Breakers, Field Quality Control Reports												D								
367	Section 26 2816, Enclosed Switches and Circuit Breakers, Operation and Maintenance Data																				
368	Section 26 3000, Short-Circuit/Coordination Study/Arc Flash Hazard Analysis, Study												D								
369	Section 26 3000, Short-Circuit/Coordination Study/Arc Flash Hazard Analysis, Final Report												D								
370	Section 26 4113, Lighting Protection for Structures, Product Data																				
371	Section 26 4113, Lighting Protection for Structures, Shop Drawings		D																		
372	Section 26 4113, Lighting Protection for Structures, Field Quality Control Reports												D								
373	Section 26 4113, Lighting Protection for Structures, Certifications																				
374	Section 26 5119, LED Interior Lighting, Product Data																				
375	Section 26 5119, LED Interior Lighting, Schedule												D								
376	Section 26 5119, LED Interior Lighting, Anchorage Devices												D								
377	Section 26 5119, LED Interior Lighting, Certificates																				
378	Section 26 5119, LED Interior Lighting, Test Reports												D								
379	Section 26 5119, LED Interior Lighting, Operation and Maintenance Data																				
380	Section 26 5619, LED Exterior Lighting, Product Data																				
381	Section 26 5619, LED Exterior Lighting, Shop Drawings		D																		
382	Section 26 5619, LED Exterior Lighting, Schedule																				
383	Section 26 5619, LED Exterior Lighting, Qualification Data												D								
384	Section 26 5619, LED Exterior Lighting, Certificates																				
385	Section 26 5619, LED Exterior Lighting, Test Report												D								
386	Section 26 5619, LED Exterior Lighting, Quality Control Reports																				
387	Section 26 5619, LED Exterior Lighting, Sample Warranty																				
388	Section 26 5619, LED Exterior Lighting, Operation and Maintenance Data												D								
389	<b>Division 27 - Communications</b>																				
390	Section 27 0500, Structured Cabling, Product Data																				
391	Section 27 0510, Grounding and Bonding for Communication Systems, Product Data																				
392	Section 27 0520, Communications Cable Management and Ladder Rack, Product Data																				

SCHEDULE OF MATERIAL SUBMITTALS										PROJECT NUMBER FAKZ999088 / 182356		PROJECT TITLE BASE SUPPLY COMPLEX / DSP		SOLICITATION/CONTRACT NO. <CONTRACT #>							
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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED					
391	Section 27 0528, Pathways for Communications Systems, Product Data																				
392	Section 27 0544, Sleeves and Sleeve Seals for Communications Pathways and Cabling, Product Data																				
393	Section 27 0544, Sleeves and Sleeve Seals for Communications Pathways and Cabling, Sustainability Submittals																				
394	Section 27 1300, Communications Optical Fiber Backbone Cabling, Product Data																				
395	Section 27 1500, Communications Copper Horizontal Cabling, Product Data																				
396	Section 27 2005, Communications and Fiber Optic Enclosures, Product Data																				
397	Section 27 2010, Communications Racks and Enclosures, Product Data																				
398	Section 27 2015, Communications Faceplates and Connectors, Product Data																				
399	Section 27 2020, Communications Patch Cords and Workstation Cords, Product Data																				
400	<b>Division 28 - Electrical Safety and Security</b> Section 28 3111, Fire Detection, Evacuation, and Mass Notification System, Product Data																				
401	Section 28 3111, Fire Detection, Evacuation, and Mass Notification System, Design Calculations																				
402	Shop Drawings																				
403	Section 28 3111, Fire Detection, Evacuation, and Mass Notification System, Closeout																				
404	<b>Division 31 - Earthwork</b> Section 31 0200, Temporary Erosion and Sediment Control, Certificate																				
405	Section 31 0200, Temporary Erosion and Sediment Control, Inspection Report																				
406	Section 31 0200, Temporary Erosion and Sediment Control, Sustainability Submittal																				
407	Section 31 1001, Site Clearing, Record Drawings																				
408	Section 31 2210, Earthwork, Material Test Reports																				
409	Section 31 3116, Termitte Control, Product Data																				
410	Section 31 3116, Termitte Control, Test Reports																				
411	Section 31 3116, Termitte Control, Manufacturer's Application Instructions																				
412	Section 31 3116, Termitte Control, Maintenance Data																				
413	Section 31 3116, Termitte Control, Warranty																				

SCHEDULE OF MATERIAL SUBMITTALS										PROJECT NUMBER FAKZ999088 / 182356		PROJECT TITLE BASE SUPPLY COMPLEX / DSP TO BE COMPLETED BY CONTRACT ADMINISTRATOR		SOLICITATION/CONTRACT NO. <CONTRACT #>							
TO BE COMPLETED BY PROJECT MANAGER										DATE TO CIVIL ENGINEERING		RETURN SUSPENSE DATE		DATE CONTRACTOR NOTIFIED		CONTRACTOR RESUBMITTAL		FINAL APPROVAL		REMARKS	
LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL	NO. OF COPIES REQUIRED										APPROVED	DIS-APPROVED								
		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURERS RECOMMENDATIONS	MANUFACTURERS WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA	DOCUMENT \ REPORT										
	<b>Division 32 - Exterior Improvements</b>																				
414	Section 32 1217, Asphalt Concrete Paving, Material Certificates	D																			
415	Section 32 1314, Cement Concrete Paving, Product Data									D											
416	Section 32 1314, Cement Concrete Paving, Design Mixes									D											
417	Section 32 1314, Cement Concrete Paving, Material Test Reports																				
418	Section 32 1314, Cement Concrete Paving, Certificates	D																			
419	Section 32 1314, Cement Concrete Paving, Sustainability Submittals																				
420	Section 32 1720, Pavement Joint Sealants, Installer Qualifications									D											
421	Section 32 1720, Pavement Joint Sealants, Product Certificates	D																			
422	Section 32 9219, Seeding, Maintenance Data																				
423	Section 32 9219, Seeding, Maintenance Contract																				
424	Section 32 9219, Seeding, Sustainability Submittals									D											
425	Section 32 9223, Sodding, Certification	D																			
426	Section 32 9223, Sodding, Maintenance Data																				

**SECTION 013225 - PROJECT SUSTAINABILITY SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT INFORMATION**

**1.02 PROJECT GOALS**

A. This project has been designed for, and must be constructed to attain a sustainability rating of GBCI GP TPC Assessment as defined in UFC 01-200-02 - High Performance Sustainable Building Requirements, With Change 4. This project is pursuing the following criteria:

1. Commissioning

- a. Submit approved Final Commissioning Report required by Section 01 9113 - General Commissioning Requirements as proof of this tracking requirement.

2. Energy Efficient Products

- a. Provide only energy-using products that are Energy Star rated, or have the Federal Energy Management Program (FEMP) recommended efficiency. Where Energy Star or FEMP recommendations have not been established, provide most efficient products that are life-cycle cost effective.

Provide only energy using products that meet FEMP requirements for low standby power consumption. Energy efficient products can be found at: <https://energy.gov/eere/femp/federal-energy-management-program> and <https://www.energystar.gov/>. Provide the following documentation:

- 1) Proof that products are labeled energy efficient and comply with the cited requirements.

3. Indoor Water Use

- a. Provide only water-consuming products that are EPA WaterSense labeled, or the most efficient water fixtures available that meet the requirements of ASHRAE 189.1 Section 6.3.2, when EPA WaterSense products are not available. Provide the following documentation:
- b. For products available with EPA WaterSense labeling, proof that fixtures are labeled EPA WaterSense or Energy Star; for all other fixtures, proof they comply with the cited efficiency requirements.

4. Reduce Volatile Organic Compounds (VOC) (Low Emitting Materials)

- a. Meet the requirements of ASHRAE 189.1 section 8.4.2.
- b. Provide certifications or labels that demonstrate compliance with cited requirements.

5. Indoor Air Quality During Construction
  - a. Prior to construction, create indoor air quality (IAQ) plan. Develop and implement the IAQ construction management plan during construction and flush building air before occupancy.
  - b. For new construction of buildings, indoor air quality plan must meet the requirements of ASHRAE 189.1 Section 10.3.1.4. (Indoor Air Quality (IAQ) Construction Management), with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent
  - c. Provide documentation showing that after construction ends and prior to occupancy, HVAC filters were replaced and building air was flushed out in accordance with the cited standard.
  
6. Recycled Content
  - a. Comply with 40 CFR 247. Refer to <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program> for assistance identifying products cited in 40 CFR 247.  
Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation, and must meet performance requirements. Provide the following documentation:
    - 1) Manufacturers' documents stating the recycled content by material, or written justification for claiming one of the exceptions allowed on the cited website.
    - 2) Substitutions: Submit for Government approval in accordance with Section 01 6300 - Product Options and Substitutions.
  
7. Bio-Based Products
  - a. Provide products and material composed of the highest percentage of biobased materials (including rapidly renewable resources and certified sustainably harvested products), consistent with FSRIA 9002 USDA BioPreferred Program, to the maximum extent possible without jeopardizing the intended end use or detracting from the overall quality delivered to the end user. Use only supplies and materials of a type and quality that conform to applicable specifications and standards.
  - b. Comply with FSRIA 9002 USDA BioPreferred Program. Refer to <https://www.biopreferred.gov/BioPreferred/> for the product categories and BioPreferred Catalog. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation, and must meet performance requirements. Provide the following documentation:
    - 1) USDA BioPreferred label for each product; for bio-based products used on project but not listed with BioPreferred program, provide bio-

based content and percentage.

- 2) In order to complete compliance with FAR 52.223-2 Affirmative Procurement of Biobased Products Under Service and Construction Contracts, refer to submittal requirement for biobased products in Section 01 78 00.

8. Waste Material Management (Recycling – Construction)

- a. Divert construction debris from landfill disposal where markets or on-site recycling exists, and provide documentation in accordance with Section 01 74 19 - Construction Waste Management and Disposal.

**1.03 RELATED REQUIREMENTS**

- A. Section 01 3329 - Sustainable Design Reporting

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 013329 - SUSTAINABLE DESIGN REPORTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General requirements for sustainable design reporting.
  - 1. This project intends to be constructed using procedures and documentation complying with the federally mandated "Guiding Principles" (GP), Third Party Certification (TPC) requirements , UFC 1-200-02, High Performance and Sustainable Building Requirements, and other requirements identified in this specification.
- B. This project does not require Third Party Certification, however the construction must meet the requirements of UFC 1-200-02.

**1.02 REPORTING REQUIREMENTS**

- A. Free-standing furniture and furnishings are not included in the Contract.
- B. Contractor must familiarize himself with the relevant reporting requirements and provide the necessary information and instruction to all subcontractors and installers.
- C. Third Party Certification (TPC) Documentation
  - 1. Not required.

**1.03 RELATED REQUIREMENTS**

- A. Section 01 3001 - Submittals for submittal requirements.
- B. Section 01 3325 - Project Sustainability Summary
- C. Section 016000 - Product Requirements.
- D. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- E. Section 017419 - Construction Waste Management and Disposal.

**1.04 DEFINITIONS**

- A. Definitions in this Article are in addition to sustainable design definitions directly related to products, as listed in Section - 016000 - Product Requirements.
- B. Indoor Air Quality (IAQ) Management Plan: Plan developed by the Contractor to provide a healthy indoor environment for workers and building occupants during construction. Plan must meet or exceed the recommendations of SMACNA (OCC) 'IAQ Guidelines for Occupied Buildings Under Construction'.

- C. Life Cycle Assessment (LCA): Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle.
- D. Material Cost: The dollar value of materials being provided to the site, after Contractor mark-ups, including transportation costs, taxes, fees, and shop labor, but excluding field equipment and field labor costs.

### **1.05 PRODUCT REPORTING SCOPE**

- A. General: Product reporting scope for the purpose of achieving the selected sustainability certification level is limited to those items directly affecting ability to achieve targeted credits.

### **1.06 REFERENCE STANDARDS**

- A. SMACNA (OCC) - IAQ Guidelines for Occupied Buildings Under Construction 2007.
- B. HPSB Guiding Principles - Guiding Principles for Sustainable Federal Buildings and Determining Compliance with the Guiding Principles for Sustainable Federal Buildings
- C. UFC 01-200-02 - High Performance Sustainable Building Requirements, With Change 4
- D. ASHRAE 189.1 - Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
- E. Energy Star - Energy Star Energy Efficiency Labeling System (FEMP)
- F. GBCI GP Assessment - Guiding Principles Assessment by GBCI (DOD Version)
- G. ASHRAE 189.1 - American Society of Heating, Refrigerating and Air-Conditioning Engineers
- H. 10 CFR 433.300 - Subpart C - Green Building Certification for Federal Buildings
- I. 40 CFR 247 - Comprehensive Procurement Guideline for Products Containing Recovered Materials

### **1.07 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for additional submittal procedures requirements.
- B. See Section 01 3001 - Submittals for additional submittal requirements
- C. Sustainable Design Documentation: The scope of required documentation is specified in this section and in applicable individual specification sections.

- D. High Performance Sustainable Building Requirements - Documentation is required for, but not limited to, the following items:
  - 1. High Performance Sustainable Building (HPSB) Checklist
    - a. Provide construction documentation that provides proof of and supports compliance with the completed HPSB Checklist.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 PROCEDURES**

- A. Submit sustainable design documentation required of Contractor, using procedures defined under Submittals for Information in Section 013000.
- B. Submit sustainable design documentation required of the Contractor, using procedures defined under Submittals for Information in Section 01 3001.
- C. Submit sustainable design documentation to The Government, unless otherwise indicated.
- D. Where an item of sustainable design documentation is specified, fill out and submit electronically the appropriate form(s), and/or use appropriate software.
  - 1. Fill out one line for each different brand name product and each different manufacturer of a lot of commodity products.
  - 2. Where required attachments are specified, attach the documentation.
- E. Each form must be signed by the entity capable of certifying the information.
  - 1. Certification signatures must be made by an officer of the company.
  - 2. For products, certification must be made by the manufacturer not the supplier.
  - 3. For custom fabricated products, certification by the fabricator is acceptable.
- F. Submit the completed forms in accordance with the requirements of Section 01 3001, as information submittals.
  - 1. Give each form a unique submittal number.
  - 2. Do not combine sustainable design documentation with product data or shop drawing submittals.

## **END OF SECTION**

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**SECTION 013553 - SECURITY PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Security measures including entry control, personnel identification, miscellaneous restrictions, and miscellaneous provisions.

**1.02 RELATED REQUIREMENTS**

- A. Section 011000 - Summary: use of premises and occupancy.

**1.03 ENTRY CONTROL**

- A. The contractor shall comply with all applicable installation/facility access and local security policies and procedures.
- B. Unscheduled gate closures by the Security Police may occur at any time causing all personnel entering or exiting a closed installation to experience a delay.
- C. The Contractor shall allow entrance to the Project site only to persons who have received approval by Base Security Forces.
- D. The Government will issue personnel identification for all Contractor and Subcontractor personnel needing access to the site.
- E. The Contractor shall provide all information required for background checks to meet installation access requirements.
- F. Information required for background checks shall be provided in ample time for review by base personnel and coordinated with the proposed schedule of the work. Delay of approval, or refusal of entry, of Contractor and/or Subcontractor personnel by Base Security Forces shall not affect completion of the Work within the stipulated contract duration. No modifications in Contract Time will be considered based upon delay in approval and/or refusal of entry of Contractor and/or Subcontractor personnel by Base Security Forces.
- G. All Contractor's personnel shall display the Base issued Contractor identification badge at all times while present on site.
- H. Comply with the Government's requirements for return and/or disposal of badges at expiration of Contractor's employment on the Work.

**1.04 MISCELLANEOUS PROVISIONS**

- A. When operating on USAF Installations, in accordance with, AFI 10-701, Operations Security (OPSEC) Instructions. The Contractor will comply with DOD Force Protection Condition Measures, DOD Standard /Level I-AT Awareness Training, and associated tasking contained in AFI 10-245, Antiterrorism (AT) standards. Level I AT Awareness training is available for Contractor personnel and can be

**DEPLOYABLE PARTS STORAGE  
DANNELLY FIELD, MONTGOMERY, AL**

**19084/FAKZ189366**

**TYPE B-3 (100%)  
APRIL 10, 2025**

requested by the 187FW7 Base Contracting Offices

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 014000 - QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Submittals.
- B. Testing and inspection agencies and services.
- C. Control of installation.
- D. Mock-ups.
- E. Manufacturers' field services.
- F. Defect Assessment.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3001 - Submittals: Submittal procedures.
- B. Section 016000 - Product Requirements: Requirements for material and product quality.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation 2017.
- B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry 2019.
- C. 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 2019.

**1.04 SUBMITTALS**

- A. Section Section 01 3001 - Submittals, for submittal procedures.
- B. Design Data: Submit for Government's knowledge for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Government's information.
- C. Report/Inspection Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
  - 1. Date of issue.
  - 2. Project title and number.

3. Name, address and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making the inspection or test.
  6. Designation of the Work and test method.
  7. Identification of product and Specification Section.
  8. Complete inspection or test data.
  9. Test results and an interpretation of test results.
  10. Ambient conditions at the time of sample-taking and testing.
  11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting.
  14. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Government, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.
  15. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Government, 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 the Government.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Government's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports for the Government's review.

1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- G. Erection Drawings: Submit drawings for the Government's review.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

### **1.05 TESTING AND INSPECTION AGENCIES AND SERVICE**

- A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.
- D. The Contractor shall employ and pay a separate, designated, experienced quality control person, to perform full time on site construction quality control services.
- E. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
1. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
- F. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
  2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
  3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

4. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
5. Security and protection of samples and test equipment at the Project site.
- G. Government Responsibilities: The Government will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are specifically noted as the Government's responsibility. If not specifically noted as the Government's responsibility, the Contractor shall provide these services.
- H. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.
- I. Lighting Protection: Contractor shall employ and pay services for a third-party inspector whose sole work is lighting protection. The Lighting Protection System shall be inspected prior to acceptance by a third-party inspector and shall be certified by this third-party inspector as compliant with AF132-1065 and NFPA 780, in that priority order. Reference UFC 3-575-01.

## **PART 2 PRODUCTS - N/A**

## **PART 3 EXECUTION**

### **3.01 CONTROL OF INSTALLATION**

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

### **3.02 MOCK-UPS**

- A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

- 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 the Government 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 the Government.

### **3.03 TESTING AND INSPECTION**

- A. The contractor shall provide all testing, inspections, and similar services; these services also include those specified to be performed by an independent agency.
- B. Testing Agency Duties:
  - 1. Provide qualified personnel at site. Cooperate with the Government 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 the Government and Contractor of observed irregularities or non-conformance of Work or products.
  - 5. Perform additional tests and inspections required by the Government.
  - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Agency may not approve or accept any portion of the Work.
  - 3. Agency may not assume any duties of Contractor.
  - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
  - 1. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  - 2. 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.
- 3. Notify the Government and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
- 4. When required, employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 5. When required, arrange with the Government's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by the Government.
- F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

### **3.04 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.

### **3.05 DEFECT ASSESSMENT**

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

**END OF SECTION**

**SECTION 014100 - REGULATORY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY OF REFERENCE STANDARDS**

- A. Regulatory requirements applicable to this project are the following:
1. All applicable National, State and Local Codes (City of Montgomery)
  2. Alabama State Fire Marshall
  3. Dannelly Airfield Fire Department
  4. Americans with Disability Act Accessibility Guidelines (ADAAG), Current Edition
  5. ICC/ANSI A117.1-2003 Design Guidelines for Accessible and Usable Building Facilities
  6. OSHA
  7. All Applicable Sections of the US Code of Federal Regulations
    - a. 28 CFR 35 Department of Justice Accessibility Regulations Relating to State and Local Governments
      - 1) 28 CFR 36 Department of Justice Accessibility Regulations Relating to Public Accommodations.
      - 2) 29 CFR 1910 Occupational Safety and Health Standards
      - 3) 36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
    - b. FED-STD-795 - Uniform Federal Accessibility Standards; 1988.
  8. All applicable Engineering Technical Letters (ANGETL)
    - a. ANGETL 10-03, Air National Guard Design Objectives and Procedures
    - b. ANGETL 15-01-00 ANG Desgn Policy
    - c. ANGETL 15-01-02 SCIF and ATFP Guidance
    - d. ANGETL 15-01-03 Fire Protection and Design
    - e. ANGETL 15-01-04 Mechanical Engineering
    - f. ANGETL 15-01-05 Electrical and Communications Engineering
    - g. ANGETL 15-01-06 Roof Design Guidance

- h. ANGETL 15-01-07 Airfield and Vehicle Pavement Design
9. Air National Guard Handbook (ANGH) 32-1084, Facility Space Standards
10. All Applicable Sections of the United Facilities Criteria
  - a. Series 1-200: UFC 1-200-01, UFC 1-200-02
    - 1) Series 3-100: UFC 3-101-01, 3-110-03, 3-120-01, 3-190-06
    - 2) Series 3-200: UFC 3-201-01, 3-201-02, 3-250-04, 3-250-11
    - 3) Series 3-300: UFC 3-301-01, 3-310-04
    - 4) Series 3-400: 3UFC -400-02, 3-401-01, 3-410-02, 3-410-04, 3-420-01, 3-420-02FA, 4-430-01FA, 3-450-01
    - 5) Series 3-500: UFC 3-501-01, 3-520-01, 3-530-01, 3-55-01N, 3-575-01, 3-580-01
    - 6) Series 3-600: UFC 3-600-01
    - 7) Series 4-400: UFC 4-010-01, 4-021-01
    - 8) Series 4-600: UFC 4-610-01
11. All National Fire Protection Association (NFPA) codes and standards referenced by Unified Facilities Criteria (UFC).
12. All model codes and standards developed by the International Code Council (ICC) referenced by Unified Facilities Criteria (UFC).
  - a. International Building Code, edition referenced in applicable UFC.
    - 1) International Fire Code, edition referenced in applicable UFC.
    - 2) International Fuel Gas Code, edition referenced in applicable UFC.
    - 3) International Mechanical Code, edition referenced in applicable UFC.
    - 4) International Plumbing Code, edition referenced in applicable UFC.
    - 5) International Electrical Code, edition reference in applicable UFC.
13. F-35 Lightning II Facilities Requirements Document, Section 3: Operational Facility Requirements, Document No. 2PJG00001, Revision Q dated 19 November 2019.

## **1.02 RELATED REQUIREMENTS**

- A. Section 014000 - Quality Requirements.

**1.03 QUALITY ASSURANCE**

- A. Designer Qualifications: Where delegated engineering design is to be performed under the construction contract provide the direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 014217 - DEFINITIONS AND STANDARDS**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including requirements of the Government's Solicitation and other Division 1 Specification Sections, apply to this Section.

**1.02 DEFINITIONS**

- A. General: Basic Contract definitions are included in the General Conditions.
- B. Indicated refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in Specifications, and similar requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.
- C. Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the Government", "requested by the Government", and similar phrases. However, no implied meaning shall be interpreted to extend the Government's responsibility into the Contractor's area of construction supervision.
- D. A.D.A.--American Disabilities Act of July 26, 1991 and all revisions to date.
- E. Approve: The term "approved," where used in conjunction with the Government's action on the Contractor's submittals, applications, and requests, is limited to the duties and responsibilities of the Government as stated in solicitation requirements. Such approval shall not release the Contractor from responsibility to fulfill Contract requirements unless otherwise provided in the Contract Documents.
- F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."
- G. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
- H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."
- I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

- J. The term "experienced," when used with the term "Installer" means having a minimum of 5 previous Projects similar in size and scope to this Project, being familiar with the precautions required, and having complied with requirements of the authority having jurisdiction.
- K. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other construction activities as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.
- L. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

### **1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION**

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's format and MASTERFORMAT numbering system.
- B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
- C. Abbreviated Language: Language used in the Specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the Contract Documents so indicates.
- D. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

### **1.04 INDUSTRY STANDARDS**

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference.
- B. Conflicting Requirements: Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents indicate otherwise. Refer requirements that are different,

but apparently equal, and uncertainties as to which quality level is more stringent to the Government for a decision before proceeding

- C. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

**END OF SECTION 01090**

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**SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Vehicular access and parking.
- E. Waste removal facilities and services.
- F. Field offices.

**1.02 RELATED REQUIREMENTS**

- A. Section 015100 - Temporary Utilities.
- B. Section 015813 - Temporary Project Signage.

**1.03 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. Telephone Land Lines: One line, minimum; one handset per line.
  - 3. Internet Connections: Minimum of one; DSL modem or faster.

**1.04 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities is not permitted.
- C. New permanent facilities may not be used during construction operations.
- D. Maintain daily in clean and sanitary condition.
- E. At end of construction, return facilities to same or better condition as originally found.

**1.05 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 or to allow for the Government's use of site and to protect existing facilities and adjacent properties from damage from construction operations .
- 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.

**1.06 FENCING**

- A. Provide minimum of 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks. Contractor is responsible for site safety. Fencing requirement listed above is a minimum only. Contractor to provide all fencing/site protection measures to ensure the safety of the site and public.
- B. Provide security and facilities to protect Work, existing facilities, and the Government's operations from unauthorized entry, vandalism, or theft.

**1.07 VEHICULAR ACCESS AND PARKING - See Section 015500**

- A. Coordinate access and haul routes with the Government.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Designated existing on-site roads may be used for construction traffic.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- F. Existing parking areas may be used for construction parking when approved by the Contracting Officer Representative.

**1.08 WASTE REMOVAL**

- A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.
- B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- C. Provide containers with lids. Remove trash from site daily.

- D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

**1.09 FIELD OFFICES - See Section 015213**

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 10 persons.
- C. Locate offices a minimum distance of 30 feet (10 m) from existing structures.

**1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to date of Beneficial Occupancy inspection.
- B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 015100 - TEMPORARY UTILITIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary Utilities: Electricity, lighting, heat, ventilation, and water.

**1.02 RELATED REQUIREMENTS**

- A. Section 015000 - Temporary Facilities and Controls:
  - 1. Temporary telecommunications services for administrative purposes.
  - 2. Temporary sanitary facilities required by law.
- B. Connect to the Government's existing power service.
  - 1. Do not disrupt the Government's need for continuous service.
  - 2. Exercise measures to conserve energy.
- 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.
- G. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft (to achieve a minimum lighting level of 21 watt/sq m).
- H. Provide and maintain 1 watt/sq ft (10.8 watt/sq m) lighting to exterior staging and storage areas after dark for security purposes.
- I. Permanent building lighting may be utilized during construction.

**1.03 TEMPORARY HEATING**

- A. Cost of Energy: By the Government.
- B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.
- D. Exercise measures to conserve energy.

- E. 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.

#### **1.04 TEMPORARY COOLING**

- A. Cost of Energy: By the Government
- B. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
- C. Maintain maximum ambient temperature of 80 degrees F (26 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.
- D. Exercise measures to conserve energy.
- E. 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. Use of permanent equipment for temporary cooling purposes shall not affect the specified warranty periods for equipment. All equipment shall be warranted for specified warranty period starting with the date of Beneficial Occupancy.

#### **1.05 TEMPORARY VENTILATION**

- A. Existing ventilation equipment may not be used.
- B. Provide temporary ventilation as required to maintain specified conditions for construction operations and as required by applicable laws and regulations to maintain a safe and healthy work environment.
- C. Cost of Water Used: By the Government.
- D. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- E. Connect to existing water source.
  - 1. Exercise measures to conserve water.
- F. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

#### **PART 2 PRODUCTS - NOT USED**

#### **PART 3 EXECUTION - NOT USED**

#### **END OF SECTION**

**SECTION 015213 - FIELD OFFICES AND SHEDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.02 RELATED REQUIREMENTS**

- A. Section 011000 - Summary: use of premises and responsibility for providing field offices.
- B. Section 015000 - Temporary Facilities and Controls:
  - 1. Temporary telecommunications services for administrative purposes.
  - 2. Temporary sanitary facilities required by law.
- C. Section 015000: Parking and access to field offices.

**1.03 USE OF EXISTING FACILITIES**

- A. Existing facilities shall not be used for field offices.

**PART 2 PRODUCTS**

**2.01 MATERIALS, EQUIPMENT, FURNISHINGS**

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

**2.02 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 at completion of Work.
- C. Exterior Materials: Weather resistant, finished in one color.
- D. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- E. Lighting for Offices: 50 fc (538 lx) at desk top height, exterior lighting at entrance doors.
- F. Fire Extinguishers: Appropriate type fire extinguisher at each office.

### **2.03 ENVIRONMENTAL CONTROL**

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

### **2.04 CONTRACTOR OFFICE AND FACILITIES**

- A. Size: For Contractor's needs and to provide space for project meetings. The field office shall be large enough to accommodate, at a minimum, the following:
  - 1. Dedicated private office space for the construction superintendent.
  - 2. Dedicated private office space for the on-site representative of the Architect.
- B. Telephone: As specified in Section 015000.
- C. Furnishings in Meeting Area:
  - 1. Two plan tables
  - 2. Filing cabinets for project documents including specifications, addenda, RFI, change orders, submittals, and record documents
  - 3. One filing cabinet for each of the full time, on-site, representatives of both the Contractor and the Architect.
  - 4. One office desk and chair for each of the full time, on-site, representatives of both the Contractor and the Architect.
  - 5. Six adjustable band protective helmets and reflective safety vests for visitors.
  - 6. Restroom facility.
  - 7. All required utilities including high speed internet for use by each of the full time, on-site, representatives of both the Contractor and the Architect.
  - 8. Personal computer/laptop and laser jet printer for each of the Contractor's full time, on-site representatives. The Architect will provide a computer/laptop and printer for the Architect's full-time, on-site representative.
  - 9. Conference table and chairs to seat at least eight persons.
- D. The Contractor will be responsible for all required utilities associated with the field office/shed including those utilities utilized by the Architect's full-time on-site representative for the duration of the consolidated award.
- E. Other Furnishings: Contractor's option.
- F. Architect, Contracting Officer Representative, and Contracting Officer shall have full use of office for the duration of the project.

**PART 3 EXECUTION**

**3.01 PREPARATION**

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

**3.02 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 the Government and Architect, connected to office by hard surfaced walk.

**3.03 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.

**3.04 REMOVAL**

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

**END OF SECTION**

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## **PART 1 GENERAL**

### **1.01 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. Code of Federal Regulations (CFR):
  - 1. OSHA General Industry Safety and Health Standards (29 CFR 1910), Publication V2206; OSHA Construction Industry Standards (29 CFR 1926). One source of these regulations is OSHA Publication 2207, which includes a combination of both Parts 1910 and 1926 as they relate to construction safety and health. It is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.
  - 2. National Emission Standards for Hazardous Air Pollutants (40 CFR, Part 61).
  - 3. Environmental Protection Agency (EPA) Final Rule (40 CFR Part 761) dated July 17, 1985.
- C. Federal Standard (Fed. Std):
  - 1. 313A Material Safety Data Sheets, Preparation and the Submission of.

### **1.02 WORK COVERED BY THIS SECTION**

- A. This section is applicable to all work covered by this contract.

### **1.03 DEFINITION OF HAZARDOUS MATERIALS**

- A. Refer to hazardous and toxic materials/substances included in Subparts H and Z of 29 CFR 1910; and to others as additionally defined in Fed. Std. 313. Those most commonly encountered include asbestos, polychlorinated biphenyls (PCB'S), explosives, and radioactive material, but may include others. The most likely products to contain asbestos are sprayed-on fireproofing, insulation, boiler lagging, pipe covering and likely products to contain PCB's are transformers, capacitors, voltage regulators, and oil switches.

### **1.04 QUALITY ASSURANCE**

- A. Safety Meeting: Representatives of the Contractor shall meet with the Contracting Officer and his/her representative(s) prior to the start of work under this contract for the purpose of reviewing the Contractor's safety and health programs and discussing implementation of all safety and health provisions pertinent to the work to be performed under the contract. The Contractor shall be prepared to discuss, in detail, the measures he/she intends to take in order to control any unsafe or unhealthy conditions associated with the work to be performed under the contract. If directed

by the Contracting Officer, this meeting may be held in conjunction with other meetings which are scheduled to take place prior to start of work under this contract.

The level of detail for the safety meeting is dependent upon the nature of the work and the potential inherent hazards. The Contractor's principal on-site representative(s), the general superintendent and his/her safety representative(s) shall attend this meeting.

- B. **Compliance With Regulations:** All work, including contact with and handling of hazardous materials, the disturbance or dismantling of structures containing hazardous materials and/or the disposal of hazardous materials shall comply with the applicable requirements of 29 CFR 1926/1910 and 40 CFR 761. Work involving the disturbance, dismantling of asbestos or asbestos containing materials; the demolition of structures containing asbestos; and/or the disposal and removal of asbestos, shall also comply with the requirements of 40 CFR, Part 61, Subparts A and M. All work shall comply with applicable state and municipal safety and health requirements. Where there is a conflict between applicable regulations, the most stringent shall apply.
- C. **Contractor Responsibility:** The Contractor shall assume full responsibility and liability for compliance with all applicable regulations pertaining to the health and safety of personnel during the execution of work, and shall hold the Government harmless for any action on his/her part or that of his/her employees or subcontractors, which results in illness, injury or death.
- D. The contractor shall provide and submit a site specific Safety Plan and Quality Control Plan for review and approval by the Government.

### **1.05 SUBMITTALS**

- A. **Accident Reporting:** A copy of each accident report, which the Contractor or subcontractors submit to their insurance carriers, shall be forwarded through the Construction Engineer to the Contracting Officer as soon as possible, but in no event later than seven (7) calendar days after the day the accident occurred.
- B. **Permits:** If hazardous materials are disposed of off site, submit copies of permits from applicable, Federal, state, or municipal authorities and necessary certificates that the material has been disposed of as per regulations.
- C. **Other Submittals:** If agreed to in writing at the safety meeting, other submittals shall be required. One such submittal which may be included is a plan of action for handling hazardous materials, which shall contain the following:
  - 1. Number, type, and experience of employees to be used for the work.
  - 2. Description of how applicable safety and health regulations and standards are to be met.
  - 3. Type of protective equipment and work procedures to be used.

4. Emergency procedures for accidental spills or exposures.
5. Procedures for disposing of or storing the toxic/hazardous materials.
6. Identification of possible hazards, problems, and proposed control mechanisms.
7. Protection of public or others not related to the operation.
8. Interfacing and control of subcontractors, if any.
9. Identifications of any required analyses, test demonstrations, and validation requirements.
10. Method of certification for compliance.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS AND EQUIPMENT**

- A. Special facilities, devices, equipment, clothing, and similar items used by the Contractor in the execution of work shall comply with the applicable regulations.

### **2.02 HAZARDOUS MATERIALS**

- A. The Contractor shall bring to the attention of the Contracting Officer any material suspected of being hazardous which he/she encounters during execution of the work. A determination will be made by the Contracting Officer as to whether the Contractor shall Perform tests to determine if the material is hazardous. If the Contracting Officer directs the Contractor to perform tests, and/or if the material is found hazardous and additional protective measures are needed, a contract change may be required, subject to applicable provisions of this contract.

## **PART 3 EXECUTION**

### **3.01 STOP WORK ORDERS**

- A. When the Contractor or his/her subcontractors are notified by the Contracting Officer's representative(s) of any noncompliance with the provisions of the contract and the action(s) to be taken, the Contractor shall immediately, if so directed, or within 48 hours after receipt of a notice of violation correct the unsafe or unhealthy condition. If the Contractor fails to comply promptly, all or any part of the work being performed may be stopped by the Contracting Officer or his/her representative(s) with a "Stop Work Order." When, in the opinion of the Contracting Officer or his/her representative(s), satisfactory corrective action has been taken to correct the unsafe and unhealthy condition, a start order will be given immediately. The Contractor shall not be allowed any extension of time or compensation for damages by reason of or in connection with such work stoppage.

**3.02 PROTECTION**

- A. The Contractor shall take all necessary precautions to prevent injury to the public, building occupants, or damage to property of others. For the purposes of this contract, the public or building occupants shall include all persons not employed by the Contractor or a subcontractor working under his/her direction.
- B. Storing, positioning or use of equipment, tools, materials, scraps, and trash in a manner likely to present a hazard to the public or building occupants by its accidental shifting, ignition, or other hazardous qualities is prohibited.
- C. Obstructions: No corridor, aisle, stairway, door, or exit shall be obstructed or used in such a manner as to encroach upon routes of ingress or egress utilized by the public or building occupant, or to present unsafe or unhealthy condition to the public or building occupant.
- D. Work shall not be performed in any area occupied by the public or Federal employees unless specifically permitted by the contract or the Contracting Officer and unless adequate steps are taken for the protection of the public or Federal employees.
- E. Wherever practicable, the work area shall be fenced, barricaded, or otherwise blocked off from the public or building occupants to prevent unauthorized entry into the work area.
- F. Alternate Precautions: When the nature of the work prevents isolation of the work area and the public or building occupants may be in or pass through, under or over the work area, alternate precautions such as the posting of signs, the use of signal persons, the erection of barricades or similar protection around particularly hazardous operations shall be used as appropriate.
- G. Public Thoroughfare: When work is to be performed over a public thoroughfare such as a sidewalk, lobby, or corridor, the thoroughfare shall be closed, if possible, or other precautions taken such as the installation of screens or barricades. When the exposure to heavy falling objects exists, as during the erection of building walls or during demolition, special protection of the type detailed in 29 CFR 1910/1926 shall be provided.
- H. Fences and barricades shall be removed upon completion of the project, in accordance with local ordinance and to the satisfaction of the Contracting Officer or his/her representative(s).

**END OF SECTION**

**SECTION 015500 - VEHICULAR ACCESS AND PARKING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Access roads.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Construction parking controls.
- E. Flag persons.
- F. Haul routes.
- G. Traffic signs and signals.
- H. Maintenance.
- I. Mud from site vehicles.

**1.02 RELATED REQUIREMENTS**

- A. Section 011000 - Summary: access to site, work sequence, and occupancy.
- B. Drawing Sheet L1.0B.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Temporary Construction: Contractor's option.
- B. Materials for Permanent Construction: As specified in product specification sections, including earthwork, paving base, and topping.

**2.02 SIGNS, SIGNALS, AND DEVICES**

- A. Post Mounted and Wall Mounted Traffic Control and Informational Signs: Specified in Section 015813 - Temporary Project Signage.
- B. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- C. Flag Person Equipment: As required by local jurisdictions.

**PART 3 EXECUTION**

**3.01 ACCESS ROADS**

- A. Use of designated existing on-site streets and driveways for construction traffic is permitted.

- B. Tracked vehicles not allowed on paved areas.
- C. Provide unimpeded access for emergency vehicles. Maintain 20 foot (6 m) width driveways with turning space between and around combustible materials.
- D. Provide and maintain access to fire hydrants free of obstructions.

### **3.02 PARKING**

- A. Use of designated areas of existing parking facilities by construction personnel is permitted.
- B. When site space is not adequate, provide additional off-site parking.

### **3.03 CONSTRUCTION PARKING CONTROL**

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Government's operations.
- B. Prevent parking on or adjacent to access roads or in non-designated areas.

### **3.04 FLAG PERSONS**

- A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

### **3.05 HAUL ROUTES**

- A. Confine construction traffic to designated haul routes as approved by the Government.
- B. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.
- C. Keep all haul roads clean and free of foreign objects debris. Refer to Part 3.08 below.

### **3.06 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. Relocate as Work progresses, to maintain effective traffic control.

### **3.07 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.

**3.08 MUD FROM SITE VEHICLES**

- A. All vehicles accessing the site shall be free of mud and other debris prior to entering the site to prevent foreign object debris (FOD) from inhibiting operations of the base.
- B. Routinely clean site paving and haul roads to remove all loose dirt and possible FOD. Coordinate with Government's representatives to maintain acceptable levels.
- C. The Government reserves the right to request vehicles be clean and/or removed from the premises due to FOD debris concerns.

**END OF SECTION**

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**SECTION 015719 - TEMPORARY ENVIRONMENTAL CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. **Construction procedures** to promote adequate **Indoor Air Quality (IAQ)** during and after construction.
  - 1. Control of emissions during construction.
  - 2. Moisture control during construction.
- B. **Procedures for testing baseline IAQ.** Baseline IAQ requirements specify maximum indoor pollutant concentrations for acceptance of the facility.
- C. **Testing indoor air quality** after completion of construction.
- D. **Testing air change effectiveness** after completion of construction.

**1.02 PROJECT GOALS**

- A. See Section 013225 - Project Sustainability Summary, 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.

**1.03 RELATED REQUIREMENTS**

- A. Section 01 3566 - Project Sustainability Summary.
- B. Section 014000 - Quality Requirements: Testing and inspection services.
- C. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- D. Section 01 9113 - Commissioning
- E. Division 23 Sections for HVAC Air Cleaning Devices: HVAC filters.

F. Division 23 Sections for HVAC Testing, Adjusting, and Balancing

#### **1.04 REFERENCE STANDARDS**

- A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size 2017 (Amended (2020)).
- B. ASHRAE Std 129 - Measuring Air-Change Effectiveness. 1997 (Reaffirmed 2002).
- C. ASTM D5197 - Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology) 2016.
- D. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers 2017, v1.2.
- E. EPA 600/4-90/010 - Compendium of Methods for the Determination of Air Pollutants in Indoor Air 1990.
- F. EPA 625/R-96/010b - Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air 1999.
- G. SMACNA (OCC) - IAQ Guidelines for Occupied Buildings Under Construction 2007.

#### **1.05 DEFINITIONS**

- A. Definitions pertaining to sustainable development: As defined in ASTM E2114.
- B. Adequate ventilation: Ventilation, including air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of particulates, dust, fumes, vapors, or gases.
- C. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
- D. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
- E. Particulates: Dust, dirt, and other airborne solid matter.
- F. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

#### **1.06 SUBMITTALS**

- A. See Section 01 3001 - Submittals 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.
  6. 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.
  9. Include post-construction IAQ management measures.
- 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. Ventilation Effectiveness Test Plan: Identify:
1. Testing agency qualifications.

2. Description of test spaces, including locations of air sampling.
  3. Test procedures, in detail; state whether tracer gas decay or step-up will be used.
  4. Test instruments and apparatus; identify tracer gas to be used.
  5. Sampling methods.
- H. Ventilation Effectiveness Test Reports: Show:
1. Include preliminary tests of instruments and apparatus and of test spaces.
  2. Calculation of ventilation effectiveness, E.
  3. Location where each sample was taken, and time.
  4. Test values for each air sample.
  5. HVAC operating conditions.
  6. Other information specified in ASHRAE Std 129.
  7. Other conditions or discrepancies that might have influenced results.
- I. IAQ Management Report: Detailed photo log of the construction IAQ management plan practices followed during construction
1. Submit log with each Application for Progress Payment; failure to submit Report will delay payment.
  2. Submit Report on a form acceptable to Government.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.
- B. Auxiliary Air Filters: MERV of 8, minimum, when tested in accordance with ASHRAE Std 52.2.

## **PART 3 EXECUTION**

### **3.01 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. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems for the duration; remove dust and dirt completely before restarting systems.
- D. Use of HVAC equipment and ductwork for ventilation during construction is not permitted:
1. Exhaust directly to outside.
  2. Seal HVAC air inlets and outlets immediately after duct installation.
- E. Do not store construction materials or waste in mechanical or electrical rooms.
- F. 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.
- G. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.
- H. Use other relevant recommendations of SMACNA (OCC) for avoiding unnecessary contamination due to construction procedures.
- I. Pathway Interruption: Isolate areas of work as necessary to prevent contamination of clean or occupied spaces. Provide pressure differentials and/or physical barriers to protect clean or occupied spaces.

### **3.02 BUILDING FLUSH-OUT**

- A. Contractor's Option: Either full continuous flush-out OR satisfactory air contaminant testing is required.

- B. Testing Option: Engage testing agency to perform satisfactory air contaminant testing. If the testing fails due high concentrations or other factors, the Contractor shall assist testing agency in supplemental flush-out. If the concentration levels remain to high, the contractor shall comply with the flush-out procedures.
- C. Perform building flush-out before occupancy.
- D. 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.
- E. 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 (4500 cubic meters per square meter) of floor area has been supplied.
  - 1. Obtain the Government's concurrence that construction is complete enough before beginning flush-out.
  - 2. Maintain interior temperature of at least 60 degrees F (15 degrees C) 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. If interior spaces must be occupied prior to completion of the flush-out, supply a minimum of 25 percent of the total air volume prior to occupancy, 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 (0.0015 cu m/s/sq m) or design minimum outside air rate, whichever is greater.
- F. Install new HVAC filtration media after completion of flush-out and before occupancy or further testing.

### **3.03 AIR CONTAMINANT TESTING**

- A. Contractor's Option: Either full continuous flush-out, or satisfactory air contaminant testing is required, not both.
- B. Perform air contaminant testing before occupancy.

- C. Prior to testing, operate the ventilation system within 10% of the design outdoor airflow rate for at least 24 hours.
- D. Conduct baseline indoor-air-quality testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's Compendium of Methods for the Determination of Toxic Organic Pollutants in Ambient Air, TO-1, TO-11, TO-17, and ASTM Standard Method D5197
- E. 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. New HVAC filtration media have been installed.
- F. 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 (2300 square meters); take samples from areas having the least ventilation and those having the greatest presumed source strength.
  - 3. Collect samples from height from 36 inches (915 mm) to 72 inches (1830 mm) 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. When retesting the same building areas, take samples from at least the same locations as in first test.
- G. Outdoor Air Samples: Collect samples at outside air intake of each air handler at the same time as indoor samples are taken.
- H. Analyze air samples and submit report.
- I. Air Contaminant Concentration Limits:
  - 1. Evaluate pollutant concentrations against the maximum allowable concentrations listed in ASHRAE 189.1 Table 10.3.1.4
  - 2. Formaldehyde: Not more than 27 parts per billion.

3. PM10 Particulates: Not more than 50 micrograms per cubic meter.
  4. Total Volatile Organic Compounds (TVOCs): Not more than 500 micrograms per cubic meter.
  5. Chemicals Listed in CAL (CDPH SM) Table 4-1, except Formaldehyde: Allowable concentrations listed in Table 4-1.
  6. Carbon Monoxide: Not more than 9 parts per million and not more than 2 parts per million higher than outdoor air.
- J. Air Contaminant Concentration Test Methods:
1. Formaldehyde: ASTM D5197, EPA 625/R-96/010b Method TO-11A, or EPA 600/4-90/010 Method IP-6.
  2. Particulates: EPA 600/4-90/010 Method IP-10.
  3. Total Volatile Organic Compounds (TVOC): EPA 625/R-96/010b Method TO-1, TO-15, or TO-17; or EPA 600/4-90/010 Method IP-1.
  4. Chemicals Listed in CAL (CDPH SM) Table 4-1, except Formaldehyde: ASTM D5197, or EPA 625/R-96/010b Method TO-1, TO-15, or TO-17.
  5. Carbon Monoxide: EPA 600/4-90/010 Method IP-3, plus measure outdoor air; measure in ppm; report both indoor and outdoor measurements.

### **3.04 VENTILATION EFFECTIVENESS TESTING**

- A. Perform ventilation effectiveness testing before occupancy.
- B. Do not begin ventilation effectiveness testing until:
  1. HVAC testing, adjusting, and balancing has been satisfactorily completed.
  2. Building flush-out or air contaminant testing has been completed satisfactorily.
  3. New HVAC filtration media have been installed.
- C. Test each air handler zone in accordance with ASHRAE Std 129.
- D. If calculated air change effectiveness for a particular zone is less than 0.9 due to inadequate balancing of the system, adjust, and retest at no cost to the Government.

**END OF SECTION**

**SECTION 016000 - PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.02 RELATED REQUIREMENTS**

- A. Section 011000 - Summary: Lists of products to be removed from existing building.
- B. Section 014000 - Quality Requirements: Product quality monitoring.
- C. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

**1.03 SUBMITTALS**

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

#### **1.04 SUBMITTAL SCHEDULE**

- A. At the beginning of the project, generate a comprehensive list of products requiring submittals by the specifications.
- B. In the schedule, include the following information for each product:
  - 1. Specification section for the product.
  - 2. Type of submittal (i.e. shop drawings, product data, samples, mock-up)
  - 3. Date submitted (to be filled in during construction)
  - 4. Action taken by Government (to be filled in during construction)
  - 5. Date Approved (to be filled in during construction)
  - 6. Comments
  - 7. Critical Relationships
- C. Coordinate product submittal schedule with project construction schedule.
- D. Submit schedule to the Government for review within 15 days of Notice to Proceed.
- E. If necessary, revise schedule as requested by the Government
- F. Schedule will be utilized at each progress meeting to review status of required submittals and coordination with project construction schedule.
  - 1. Update submittal schedule and submit to the Government 48 hours prior to each scheduled progress meeting.

#### **1.05 QUALITY ASSURANCE**

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
- B. Each prime Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate Contractors.
- C. If a dispute arises between prime Contractors over concurrently selectable, but incompatible products, the Government will determine which products shall be retained and which are incompatible and must be replaced.
- D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
- E. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not

conspicuous.

## **PART 2 PRODUCTS**

### **2.01 EXISTING PRODUCTS**

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Government, or otherwise indicated as to remain the property of the Government, become the property of the Contractor; remove from site.

### **2.02 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. DO NOT USE products having any of the following characteristics:
  - 1. Made using or containing CFC's or HCFC's.
  - 2. Made of wood from newly cut old growth timber.
- C. Where all other criteria are met, Contractor shall give preference to products that:

### **2.03 PRODUCT SELECTION**

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
- B. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
- C. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- D. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:
- E. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
- F. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product

- that complies with the standards, codes or regulations specified.
- G. Visual Matching: Where Specifications require matching an established Sample, the Contracting Officer Representative's decision will be final on whether a proposed product matches satisfactorily.
  - H. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.
  - I. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Government will select the color, pattern and texture from the product line selected.

#### 2.04 PRODUCT OPTIONS

- A. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

#### 2.05 LIMITED SOURCE PRODUCT REQUIREMENTS

- A. The following products/manufacturers are require to be provided, by name, with substitutions not allowed
  - 1. Johnson Controls, Inc., for building automation and energy management systems and equipment.
  - 2. ADVANTOR Systems for furnishing and installation of Intrusion Detection, Access Control, and Closed Circuit TV systems.
  - 3. Monaco Enterprises, Inc., for fire alarm transceiver antennae for communication with existing base fire alarm reporting systems.
  - 4. ***BEST Access System Lockset for door cores/locks. Contractor shall ensure all cylinders and other door hardware components are compatible with specified BEST systems and capable of receiving BEST Cores. (Added by Addendum No. 1)***
- B. Refer to the Government's limited source justification(s) included with the project solicitation for additional information.

## **2.06 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**

### **3.01 SUBSTITUTION LIMITATIONS**

- A. The Government will consider requests for substitutions only within 30 days after date established in Notice to Proceed.
  - 1. Substitutions received after this time period may be considered or rejected at the discretion of the Government.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. 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 the Government.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 5. Will reimburse the Government for review or redesign services associated with re-approval by authorities.
- D. 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.
- E. Substitution Submittal Procedure:
  - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
  - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.

3. The Government will notify Contractor in writing of decision to accept or reject request.
- F. Conditions: The Contractor's substitution request will be received and considered by the Government only when one or more of the following conditions are satisfied, as determined by the Government; otherwise requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
  2. Proposed changes are in keeping with the general intent of Contract Documents.
  3. The request is timely, fully documented and properly submitted.
  4. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
  5. A substantial advantage is offered the Government, in terms of cost, time, energy conservation or other considerations of merit
  6. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
  7. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
  8. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
- G. The Government reserves the right to reject any substitutions.

### **3.02 GOVERNMENT-SUPPLIED PRODUCTS**

- A. The Government's Responsibilities
1. Arrange for and deliver Government reviewed shop drawings, product data and samples, to Contractor.
  2. Arrange and pay for product delivery to site unless specifically noted otherwise.
  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 Government reviewed shop drawings, product data, and samples.
  2. Receive and unload products at site; inspect for completeness or damage jointly with the Government
  3. Handle, store, install and finish products.
  4. Repair or replace items damaged after receipt.
  - 5.

### **3.03 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. 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.

### **3.04 STORAGE AND PROTECTION**

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in 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. If approved by the Government, provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- K. Prevent contact with material that may cause corrosion, discoloration, or staining.
- L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- N. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
- O. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- P. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
- Q. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

**END OF SECTION**

**SECTION 016116 - VOLATILE ORGANIC COMPOUND (VOC) CONTENT  
RESTRICTIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3001 - Submittas: Submittal procedures.
- B. Section 01 3566 - Project Sustainability Summary.
- C. Section 014000 - Quality Requirements: Procedures for testing and certifications.
- D. Section 015719 - Temporary Environmental Controls: Procedures and testing.
- E. Section 016000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

**1.03 DEFINITIONS**

- A. VOC-Restricted 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.
  - 3. Carpet cushion.
  - 4. Carpet tile.
  - 5. Resilient floor coverings.
  - 6. Wood flooring.
  - 7. Paints and coatings.
  - 8. Insulation.
  - 9. Gypsum board.
  - 10. Acoustical ceilings and panels.
  - 11. Cabinet work.
  - 12. Wall coverings.

13. Composite wood and agrifiber products used either alone or as part of another product.
  14. Other products when specifically stated in the specifications.
- B. Interior of Building: Anywhere inside the exterior weather barrier.
- 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.

#### **1.04 REFERENCE STANDARDS**

- A. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at [www.chps.net/](http://www.chps.net/).
- B. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers 2017, v1.2.
- C. CRI (GLCC) - Green Label Testing Program - Approved Product Categories for Carpet Cushion; Carpet and Rug Institute; Current Edition.
- D. CRI (GLP) - Green Label Plus Testing Program - Certified Products Current Edition.
- E. UL (GGG) - GREENGUARD Gold Certified Products; UL Environment; current listings at <http://http://productguide.ulenvironment.com/QuickSearch.aspx>.
- F. GreenSeal GS-36 - Adhesives for Commercial Use 2013.
- G. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).
- H. SCS (CPD) - SCS Certified Products Current Edition.
- I. ASHRAE 189.1 - Standard for the Design of High-Performance Green Buildings

#### **1.05 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Evidence of Compliance: Submit for each different product in each applicable category.
- C. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. All VOC-Restricted Products: Provide products having VOC content of types and volume not greater than those specified in State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers.
1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Current GREENGUARD Children & Schools certification; [www.greenguard.org](http://www.greenguard.org).
    - b. Current Carpet and Rug Institute Green Label Plus certification; [www.carpet-rug.org](http://www.carpet-rug.org).
    - c. Current SCS Floorscore certification; [www.scs-certified.com](http://www.scs-certified.com).
    - d. Current SCS Indoor Advantage Gold certification; [www.scs-certified.com](http://www.scs-certified.com).
    - e. Product listing in the CHPS Low-Emitting Materials Product List at [www.chps.net/manual/lem\\_table.htm](http://www.chps.net/manual/lem_table.htm).
    - f. Current certification by any other agencies acceptable to CHPS.
    - g. Report of laboratory testing performed in accordance with CHPS requirements for getting a product listed in the Low-Emitting Materials Product List; report must include laboratory's statement that the product meets the specified criteria.
- B. Adhesives and Joint Sealants: Provide only products having volatile organic compound (VOC) content not greater than required by South Coast Air Quality Management District Rule No.1168.
1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Report of laboratory testing performed in accordance with requirements.
    - b. Published product data showing compliance with requirements.
    - c. Certification by manufacturer that product complies with requirements.
- C. Aerosol Adhesives: Provide only products having volatile organic compound (VOC) content not greater than required by GreenSeal GS-36.
1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Current GreenSeal Certification.
    - b. Report of laboratory testing performed in accordance with GreenSeal GS-36 requirements.

- c. Published product data showing compliance with requirements.

**D. Paints and Coatings:**

1. Provide coatings that comply with the most stringent requirements specified in the following:
    - a. Provide flat and non flat topcoats, primers, undercoaters, and anti-corrosive coatings products having volatile organic compounds (VOC) content not greater than required by Green Seal Standard GS-11
    - b. Concrete/masonry sealers (waterproofing concrete/masonry sealers), concrete curing compounds, dry fog coatings, faux finishing coatings, fire resistive coatings, floor coatings, graphic arts (sign) coatings, pretreatment wash primers, reactive penetrating sealers, recycled coatings, shellacs (clear and opaque), specialty primers, stains, wood coatings (clear and opaque), specialty primers, stains, wood coatings (clear wood finishes), wood preservatives, and zinc primer products having volatile organic compounds (VOC) content not greater than required by California Air Resources Board Suggested Control Measure for Architectural Coatings or SCAQMD Rule 1113
    - c. Basement specialty coatings, high-temperature coatings, low solids coatings, stone consolidants, swimming-pool coatings, tub- and tile-refining coatings, and waterproofing membrane products having volatile organic compounds (VOC) content not greater than required by California Air Resources Board Suggested Control Measure for Architectural Coatings.
  2. Determination of VOC Content:
    - a. 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.
  3. Evidence of Compliance: Acceptable types of evidence are:
    - a. Report of laboratory testing performed in accordance with requirements.
    - b. Published product data showing compliance with requirements.
    - c. Certification by manufacturer that product complies with requirements.
- E. Carpet and Hard Surface Flooring: Testing and calculation in accordance with and shown to be compliant with the requirements of CDPH/EHLB/Standard Method V1.1 (commonly referred to as California Section 01350).**
1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Report of laboratory testing performed in accordance with requirements.

- b. Published product data showing compliance with requirements.
  - c. Certification by manufacturer that product complies with requirements.
- F. Composite Wood, Wood Structural Panel, and Agrifiber Products: Provide products that comply with one of the following:
- 1. Third-party certification shall be submitted indicating compliance with the California Air Resource Board's (CARB) Regulation, Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products. Third-party certifier shall be approved by CARB.
  - 2. CDPH/EHLB/Standard Method V1.1 (commonly referred to as California Section 01350) and shall comply with the limit requirements for either office or classroom spaces

### **PART 3 EXECUTION**

#### **3.01 FIELD QUALITY CONTROL**

- A. The Government 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 the Government.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

**END OF SECTION**

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**SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.02 RELATED REQUIREMENTS**

- A. Section 01 0102 - Project Information & Summary Project Information & Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3001 -Submittals: Submittals procedures, Electronic document submittal service.
- C. Section 01 3325 - Project Sustainability Summary
- D. Section 01 3329 - Sustainable Design Reporting
- E. Section 014000 - Quality Requirements: Testing and inspection procedures.
- F. Section 015100 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.
- G. Section 017800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
- H. Section 017900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

- I. Section 024100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.
- J. Section 078400 - Firestopping.

### **1.03 REFERENCE STANDARDS**

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

### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. See Section 01 3001 - Submittals, for submittal procedures.
- C. 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.
- D. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
  - 2. Identify demolition firm and submit qualifications.
  - 3. Include a summary of safety procedures.
- E. 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 the Government or separate Contractor.
- F. Project Record Documents: Accurately record actual locations of capped and active utilities.

### **1.05 QUALIFICATIONS**

- A. For demolition work, employ a firm specializing in the type of work required.
- B. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to the Government. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.
- C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

### **1.06 PROJECT CONDITIONS**

- A. Use of explosives is not permitted.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
  - 1. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
  - 2. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
  - 3. Refer to division 31 specification for additional requirements.
- F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

### **1.07 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having

- interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
  - E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
  - F. Coordinate completion and clean-up of work of separate sections.
  - G. After Government occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Government activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

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

### **3.02 PREPARATION**

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

### **3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Government 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.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Contracting Officer, Contracting Officer Representative, participants, and those affected by decisions made.

### **3.04 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify the Government of any discrepancies discovered
- C. Contractor shall locate and protect survey control and reference points.
- D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- E. Promptly report to the Government the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to the Government.
- G. Utilize recognized engineering survey practices.

- H. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- I. 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.
- J. Periodically verify layouts by same means.
- K. Maintain a complete and accurate log of control and survey work as it progresses.
- L. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical Work.
- M. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.
- N. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction. Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction with construction.

### **3.05 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.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to the Government before disturbing existing installation.
- F. 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. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to the Contracting Officer Representative.
  - 3. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
  - 4. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Government review and request instructions.
  - 5. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.

### **3.06 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Refer to Specification Section 01 0450 for additional requirements.

### **3.07 DUST CONTROL**

- A. The Contractor shall be responsible to provide continuous (7 days per week, 24 hours per day) fugitive dust control measures within the limits of the construction site, related sites and adjacent streets and roads. Dust control shall be provided for, but not be specifically limited to, the stabilization of unpaved roads, haul roads, access roads, spoil sites, borrow and material sources, excavations, embankments, stockpiles, and all other areas which become potential sources of dust as a result of construction activities.
- B. In order to control fugitive dust emissions, Contractor shall apply the following procedures and techniques:
  - 1. Cover loads of materials, debris and waste materials taken from construction sites as needed to suppress dust during transit.

2. Water down or apply other approved dust control measures to the construction site, haul roads and public access roads as needed to suppress dust.
3. All mud and dirt shall be removed from vehicles prior to entering a paved or graveled area or road. Any mud or dirt that is carried out onto paved or graveled surfaces shall be removed from surfaces immediately and no less than daily.

### **3.08 PROGRESS CLEANING**

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

### **3.09 PROTECTION OF INSTALLED WORK**

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

### **3.10 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. 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. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### **3.11 DEMONSTRATION AND INSTRUCTION**

- A. See Section 017900 - Demonstration and Training.
- B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with the Government's personnel in detail to explain all aspects of operation and maintenance.
- C. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- D. Demonstration to include identification of air filter locations and filter replacement procedures.

### **3.12 ADJUSTING**

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

### **3.13 FINAL CLEANING**

- A. Execute final cleaning after Beneficial Occupancy but before making final application for payment.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, drainage systems, and any other roof or drainage elements.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.14 CLOSEOUT PROCEDURES**

- A. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Beneficial Occupancy.
- B. Refer to requirements of General Conditions of the Contract for Construction.
- C. Beneficial Occupancy
  - 1. Notify the Government when work is considered ready for Government's Beneficial Occupancy inspection.
  - 2. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for the Government's Beneficial Occupancy inspection.
  - 3. Notify the Government of intended date of Beneficial Occupancy as early as is feasibly possible. The Government will schedule Final Inspection of the work with the Government. Contractor shall coordinate attendance of the Final Inspection by local Fire Department and other code officials requiring attendance.
  - 4. Upon completion of the Final Inspection, if the work is deemed substantially complete, the Government will distribute a Certificate of Beneficial Occupancy with "Punch List" of items required to be corrected by the Contractor prior to Final Acceptance of the Work.
- D. Final Acceptance
  - 1. Correct items of work listed in executed Certificates of Beneficial Occupancy.
  - 2. Notify the Government when work is considered finally complete.
  - 3. Submit a certified copy of the Government's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Government.

4. Upon completion of reinspection, the Government will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
  5. If necessary, reinspection will be repeated until all items of work are completed.
  6. Submit final meter readings for utilities and similar data as of the date of Beneficial Occupancy.
  7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  8. Submit the final payment request with releases and supporting documentation as outlined in the General Conditions of the Contract for Construction.
- E. Conduct Beneficial Occupancy inspection and create Final Correction Punch List containing Government's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Government.

### **3.15 MAINTENANCE**

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

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**SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 GENERAL**

**1.01 WASTE MANAGEMENT REQUIREMENTS**

- A. Government 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. Required Recycling, Salvage, and Reuse: The following may NOT be disposed of in landfills or by incineration:
  - 1. Aluminum and plastic beverage containers.
  - 2. Corrugated cardboard.
  - 3. Wood pallets.
  - 4. Clean dimensional wood: May be used as blocking or furring.
  - 5. Land clearing debris, including brush, branches, logs, and stumps; see Section 311000 - Site Clearing for use options.
  - 6. Concrete.
  - 7. Bricks.
  - 8. Concrete masonry units.
  - 9. Asphalt paving.
  - 10. 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.
  - 11. Glass.
  - 12. Gypsum drywall and plaster.
  - 13. Plastic buckets.
  - 14. Carpet, carpet cushion, carpet tile, and carpet remnants , both new and removed: DuPont (<http://flooring.dupont.com>) and Interface ([www.interfaceinc.com](http://www.interfaceinc.com)) conduct reclamation programs.

15. Paint.
  16. Plastic sheeting.
  17. Rigid foam insulation.
  18. Windows, doors, and door hardware.
  19. Plumbing fixtures.
  20. Mechanical and electrical equipment.
  21. Fluorescent lamps (light bulbs).
  22. Acoustical ceiling tile and panels.
- E. HPSB Compliance for this project is dependent on diversion of 60 percent, by weight or volume, of potential landfill trash/waste by recycling and/or salvage.
- F. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- G. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
- H. 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.
  5. Incineration, either on- or off-site.
- I. 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.

## **1.02 RELATED REQUIREMENTS**

- A. See Section 01 3001 - Submittals: Additional requirements for project meetings, reports, submittal procedures and project documentation.
- B. Section 015000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

- C. Section 016000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- D. Section 017000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.
- E. Section 311000 - Site Clearing: Handling and disposal of land clearing debris.

### **1.03 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.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. HPSB Submittals: Submit Waste Management Plan and Waste Disposal Reports.
- C. Submit Waste Management Plan within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.
- D. Waste Management Plan: Include the following information:
  - 1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
  - 2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
  - 3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
    - a. List each material proposed to be salvaged, reused, or recycled.
  - 4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
  - 5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
  - 6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
  - 7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.
- E. 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. Submit Report on a form acceptable to Government.
3. Landfill Disposal: Include the following information:
  - a. Identification of material.
  - b. Amount, in tons or cubic yards (cubic meters), 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 (cubic meters), 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 (cubic meters).
  - c. Include weight tickets as evidence of quantity.
6. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

### **1.05 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

- B. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:
1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator as project requires.
  2. Review requirements for documenting quantities of each type of waste and its disposition.
  3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  5. Review waste management requirements for each trade.

### **1.06 WASTE MANAGEMENT PLAN**

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
  2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.

5. **Disposed Materials:** Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  6. **Handling and Transportation Procedures:** Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
- D. **Cost/Revenue Analysis:** Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
1. Total quantity of waste.
  2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
  3. Total cost of disposal (with no waste management).
  4. Revenue from salvaged materials.
  5. Revenue from recycled materials.
  6. Savings in hauling and tipping fees by donating materials.
  7. Savings in hauling and tipping fees that are avoided.
  8. Handling and transportation costs. Include cost of collection containers for each type of waste.
  9. Net additional cost or net savings from waste management plan.

### **PART 3 EXECUTION**

#### **2.01 WASTE MANAGEMENT PROCEDURES**

- A. See Section 01 3001 - Submittals, for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 015000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 016000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 017000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

**2.02 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, Government, 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. 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. As a minimum, provide:
    - a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
    - b. Separate dumpsters for each category of recyclable.
    - c. Recycling bins at worker lunch area.
  - 2. Provide containers as required.
  - 3. Locate enclosures out of the way of construction traffic.
  - 4. Provide adequate space for pick-up and delivery and convenience to subcontractors.
  - 5. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. 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.

- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

**END OF SECTION**

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**SECTION 017800 - CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3001 - Submittals: submittal proceddures, shop drawings, warranty, and correction of work.
- B. Section 01 3325 - Project Sustainability Summary
- C. Section 01 3329 - Sustainable Design Reporting
- D. Section 017000 - Execution and Closeout Requirements: Contract closeout procedures.
- E. Individual Product Sections: Specific requirements for operation and maintenance data.
- F. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to the Government 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. The Government will review draft and return one copy with comments.
  - 2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Government comments. Revise content of all document sets as required prior to final submission.
  - 3. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. Make other submittals within 10 days after Date of Beneficial Occupancy, prior to final Application for Payment.

2. For items of Work for which acceptance is delayed beyond Date of Beneficial Occupancy, 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**

1. Specifications.
  2. Reviewed shop drawings, product data, and samples.
  3. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by the Government.
- C. 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.
- D. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
- E. The Government will review project record documents on a monthly basis to ensure changes in the work are being accurately recorded.
- F. 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.

**3.02 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
1. Product data, with catalog number, size, composition, and color and texture designations.
  2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Additional information as specified in individual product specification sections.

- D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

### **3.03 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 list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- K. Include test and balancing reports.
- L. Additional Requirements: As specified in individual product specification sections.

**3.04 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for the Government'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 (216 by 280 mm) three D side ring binders with durable plastic covers; 3 inch (76 mm) 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 The Government, Consultants, Contractor and 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 20 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- M. 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 The Government, 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.
    - b. Certificates.
    - c. Photocopies of warranties and bonds.
- N. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- O. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of The Government , Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
- P. Combine all of the above listed documents into a tabbed and organized electronic file in .pdf format for review. Update the electronic file as requested by the Government until documents are complete and acceptable to the Government. Following acceptance of the electronic file, print and bind one hard copy, as described above, and deliver it to the Government.

### **3.05 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 the Government's permission, leave date of beginning of time of warranty until Date of Beneficial Occupancy 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 (216 by 279 mm) 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.
- I. Combine all of the above listed documents into a tabbed and organized electronic file in .pdf format for review. Update the electronic file as requested by the Government until documents are complete and acceptable to the Government. Following acceptance of the electronic file, print and bind one hard copy, as described above, and deliver it to the Government.

**END OF SECTION**

**SECTION 017900 - DEMONSTRATION AND TRAINING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.
- B. Training of Government 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. Items specified in individual product Sections.
  - 6. Advantor Security Systems.
- C. Training of Government 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.

**1.02 RELATED REQUIREMENTS**

- A. Section 017800 - Closeout Submittals: Operation and maintenance manuals.
- B. Section 019113 - General Commissioning Requirements: Additional requirements applicable to demonstration and training.
- C. Other Specification Sections: Additional requirements for demonstration and training.

**1.03 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures; except:
  - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority.
  - 2. Submit one copy to the Commissioning Authority, not to be returned.

3. Make commissioning submittals on time schedule specified by Commissioning Authority.
  4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of overall Training Plan; submit in editable electronic format, Microsoft Word 2003 preferred.
- B. Draft Training Plans: Government will designate personnel to be trained; tailor training to needs and skill-level of attendees.
1. Submit to Commissioning Authority for review and inclusion in overall training plan.
  2. Submit not less than four weeks prior to start of training.
  3. Revise and resubmit until acceptable.
  4. Provide an overall schedule showing all training sessions.
  5. Include at least the following for each training session:
    - a. Identification, date, time, and duration.
    - b. Description of products and/or systems to be covered.
    - c. Name of firm and person conducting training; include qualifications.
    - d. Intended audience, such as job description.
    - e. Objectives of training and suggested methods of ensuring adequate training.
    - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
    - g. Media to be used, such a slides, hand-outs, etc.
    - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
1. Include applicable portion of O&M manuals.
  2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
  3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:

1. Identification of each training session, date, time, and duration.
  2. Sign-in sheet showing names and job titles of attendees.
  3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
  4. Include Commissioning Authority's formal acceptance of training session.
- E. Video Recordings: Submit digital video recording of each demonstration and training session for Government's subsequent use.

#### **1.04 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**

##### **3.01 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 Government.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Government personnel training is specified.
- C. Demonstration may be combined with Government 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 Beneficial Occupancy.
  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 Beneficial Occupancy.

### **3.02 TRAINING - GENERAL**

- A. Commissioning Authority will prepare the Training Plan based on draft plans submitted.
- B. Conduct training on-site unless otherwise indicated.
- C. Government will provide classroom and seating at no cost to Contractor.
- D. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.
- E. Provide training in minimum two hour segments.
- F. The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.
- G. Training schedule will be subject to availability of the Government's personnel to be trained; re-schedule training sessions as required by the Government; once schedule has been approved by the Government failure to conduct sessions according to schedule will be cause for the Government to charge Contractor for personnel "show-up" time.
- H. Training schedule will be subject to availability of the Government's personnel to be trained; re-schedule training sessions as required by Government.
- I. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  1. The location of the O&M manuals and procedures for use and preservation; backup copies.
  2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  3. Typical uses of the O&M manuals.
- J. Product- and System-Specific Training:
  1. Review the applicable O&M manuals.
  2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.

4. Provide hands-on training on all operational modes possible and preventive maintenance.
  5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
  6. Discuss common troubleshooting problems and solutions.
  7. Discuss any peculiarities of equipment installation or operation.
  8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
  9. Review recommended tools and spare parts inventory suggestions of manufacturers.
  10. Review spare parts and tools required to be furnished by Contractor.
  11. Review spare parts suppliers and sources and procurement procedures.
- K. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**

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**SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
  - 1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
  - 2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
  - 3. Verify that operation and maintenance manuals submitted to the Government are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
  - 4. Verify that the Government's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.
- B. Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Beneficial Occupancy
- C. The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.
- D. The Commissioning Authority is employed by the Contractor. All costs associated with Commissioning Services specified shall be included in the Contractor's bid.
  - 1. The contractor will be accountable for those responsibilities outlined in specification section 01 9113 - General Commissioning Requirements, and for compliance with the Commissioning Plan and correction of deficiencies, re-inspection, and re-testing, as applicable at no extra cost to the Government.

**1.02 SCOPE OF COMMISSIONING**

- A. The following are to be commissioned:
- B. Plumbing Systems:
  - 1. Water heaters.
  - 2. Booster pumps.

- C. HVAC System, including:
  - 1. Major and minor equipment items.
  - 2. Piping systems and equipment.
  - 3. Ductwork and accessories.
  - 4. Terminal units.
  - 5. Control system.
  - 6. Variable frequency drives.
- D. Electrical Systems:
  - 1. Power quality.
  - 2. Emergency power systems.
  - 3. Uninterruptible power systems.
  - 4. Lighting controls other than manual switches.
- E. Electronic Safety and Security:
  - 1. Security system, including doors and hardware.
  - 2. Fire and smoke alarms.
- F. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- G. Indoor Air Quality Procedures: The Commissioning Authority will coordinate; Contractor will execute; see Section 015719 - Temporary Environmental Controls.

### **1.03 RELATED REQUIREMENTS**

- A. Section 01 33325 - Project Sustainability Summary
- B. Section 01 - 3329 - Sustainable Design Reporting
- C. Section 015719 - Temporary Environmental Controls: Precautions and procedures; smoking room testing; building flush-out.
- D. Section 017000 - Execution and Closeout Requirements: General startup requirements.
- E. Section 017800 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.
- F. Section 01 7900 - Demonstration and Training: Scope and procedures for Government personnel training.

- G. Section 230800 - Commissioning of HVAC: HVAC control system testing; other requirements.

#### **1.04 REFERENCE STANDARDS**

- A. CSI/CSC MF - Masterformat 2016.
- B. PECI (Samples) - Sample Forms for Prefunctional Checklists and Functional Performance Tests Current Edition.
- C. See Section 01 3001 - Submittals, for submittal procedures; except:
1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority, unless they require review by the Government; in that case, submit to Contracting Officer Representative first
  2. Submit one copy to the Commissioning Authority, not to be returned.
  3. Make commissioning submittals on time schedule specified by Commissioning Plan.
  4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word 2010 preferred.
- D. Product Data: If submittals to the Government do not include the following, submit copies as soon as possible:
1. Manufacturer's product data, cut sheets, and shop drawings.
  2. Manufacturer's installation instructions.
  3. Startup, operating, and troubleshooting procedures.
  4. Fan and pump curves.
  5. Factory test reports.
  6. Warranty information, including details of the Government's responsibilities in regard to keeping warranties in force.
- E. Startup Plans and Reports.
- F. Completed Prefunctional Checklists.

## **PART 2 PRODUCTS**

### **2.01 TEST EQUIPMENT**

- A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of the Government.
- B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
  - 1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 degree F (0.3 degree C) and resolution of plus/minus 0.1 degree F (0.05 degree C).
  - 2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
  - 3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.
- C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to the Government; such equipment, tools, and instruments are to become the property of Government.
- D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
  - 1. Dataloggers required to for Functional Tests will be provided by the Commissioning Authority and will not become the property of the Government.

## **PART 3 EXECUTION**

### **3.01 COMMISSIONING PLAN**

- A. Commissioning Authority will prepare the Commissioning Plan.
  - 1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
  - 2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.
- B. Contractor is responsible for compliance with the Commissioning Plan.

- C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.
  - 1. Commissioning will be phased (by floors, for example) to minimize the total construction time.
- D. Basis of Design Documentation (BOD): Detailed documentation of the functional requirements of the project; descriptions of the systems, components, and methods chosen to meet the design intent; assumptions underlying the design intent.
  - 1. Basis of Design Documentation is to be prepared by the Commissioning Agent with input from the Government.
- E. Commissioning Schedule:
  - 1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after start of work.
  - 2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
  - 3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
  - 4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

### **3.02 DOCUMENTATION IDENTIFICATION SYSTEM**

- A. Give each submitted form or report a unique identification; use the following scheme.
- B. Type of Document: Use the following prefixes:
  - 1. Startup Plan: SP-.
  - 2. Startup Report: SR-.
  - 3. Prefunctional Checklist: PC-.
  - 4. Functional Test Procedure: FTP-.
  - 5. Functional Test Report: FTR-.
- C. System Type: Use the first 4 digits from CSI/CSC MF (Master Format), that are applicable to the system; for example:
  - 1. 2300: HVAC system as a whole.
  - 2. 2320: HVAC Piping and Pumps.
  - 3. 2330: HVAC Air Distribution.

- D. Component Number: Assign numbers sequentially, using 1, 2, or 3 digits as required to accommodate the number of units in the system.
- E. Test, Revision, or Submittal Number: Number each successive iteration sequentially, starting with 1.
- F. Example: PC-2320-001.2 would be the Prefunctional Checklist for equipment item 1 in the HVAC piping system, probably a pump; this is the second, revised submittal of this checklist.

### **3.03 STARTUP PLANS AND REPORTS**

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

### **3.04 PREFUNCTIONAL CHECKLISTS**

- A. A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
  - 1. No sampling of identical or near-identical items is allowed.
  - 2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
  - 3. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
    - a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
    - b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
    - c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
    - d. Serial number of installed unit.
    - e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.

- f. Sensor and actuator calibration information.
  4. PECEI (Samples) found at <http://www.peci.org/library/mcpgs.htm> indicate anticipated level of detail for Prefunctional Checklists.
- B. Contractor is responsible for filling out Prefunctional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.
1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
  2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
  3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
  4. If any Checklist line item is not relevant, record reasons on the form.
  5. Contractor may independently perform startup inspections and/or tests, at his option.
  6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
  7. Submit completed Checklists to Commissioning Authority within two days of completion.
- C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.
1. Initial Drafts: Contractor is responsible for initial draft of Prefunctional Checklist where so indicated in the Contract Documents.
  2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
  3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in the Contract Documents or not.
  4. When asked to review the proposed Checklists, do so in a timely manner.
- D. Commissioning Authority Witnessing: Required for:

1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
  2. A sampling of non-primary equipment, as allowed by the commissioning plan.
- E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to the Government.
1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

### **3.05 FUNCTIONAL TESTS**

- A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.
- B. Contractor is responsible for execution of required Functional Tests, after completion of Prefunctional Checklist and before closeout.
- C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.
- D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to the Government; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.
1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.
  2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
  3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
  4. Contractor shall bear the cost of the Government and Commissioning Authority personnel time witnessing re-testing.
  5. Contractor shall bear the cost of the Government and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Prefunctional Checklist correctly; if the test failed for reasons that would not have been identified in the Prefunctional Checklist process,

Contractor shall bear the cost of the second and subsequent re-tests.

**E. Functional Test Procedures:**

1. Some test procedures are included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
2. Examples of Functional Testing:
  - a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
  - b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
  - c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.
  - d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.
3. Peci (Samples) found at <http://www.peci.org/library/mcpgs.htm> indicated anticipated level of detail for Functional Tests.

**F. Deferred Functional Tests:** Some tests may need to be performed later, after Beneficial Occupancy, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

**3.06 SENSOR AND ACTUATOR CALIBRATION**

- A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gages, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
- B. Calibrate using the methods described below; alternate methods may be used, if approved by Commissioning Authority and the Government beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Prefunctional Checklist or other suitable forms, documenting initial, intermediate and final results.

**C. All Sensors:**

1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
2. Verify that sensors with shielded cable are grounded only at one end.
3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2 degree F (0.1 degree C) of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
4. Tolerances for critical applications may be tighter.

**D. Sensors Without Transmitters - Standard Application:**

1. Make a reading with a calibrated test instrument within 6 inches (150 mm) of the site sensor.
2. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
3. If not, install offset, calibrate or replace sensor.

**E. Sensors With Transmitters - Standard Application.**

1. Disconnect sensor.
2. Connect a signal generator in place of sensor.
3. Connect ammeter in series between transmitter and building automation system control panel.
4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
7. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
8. Reconnect sensor.
9. Make a reading with a calibrated test instrument within 6 inches (150 mm) of the site sensor.

10. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
  11. If not, replace sensor and repeat.
  12. For pressure sensors, perform a similar process with a suitable signal generator.
- F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
1. Watthour, Voltage, Amperage: 1 percent of design.
  2. Pressure, Air, Water, Gas: 3 percent of design.
  3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F (0.2 degree C).
  4. Relative Humidity: 4 percent of design.
  5. Barometric Pressure: 0.1 inch of Hg (340 Pa).
  6. Flow Rate, Air: 10 percent of design.
  7. Flow Rate, Water: 4 percent of design.
  8. Flow Rate, Steam: 3 percent of design.
  9. AHU Wet Bulb and Dew Point: 2.0 degrees F (1.1 degrees C).
  10. Hot Water Coil and Boiler Water Temperature: 1.5 degrees F (0.8 degrees C).
  11. Cooling Coil, Chilled and Condenser Water Temperatures: 0.4 degrees F (0.2 degree C).
  12. Combustion Flue Temperature: 5.0 degrees F (2.8 degrees C).
  13. Oxygen and CO<sub>2</sub> Monitors: 0.1 percentage points.
  14. CO Monitor: 0.01 percentage points.
  15. Natural Gas and Oil Flow Rate: 1 percent of design.
- G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.
- H. Valve/Damper Stroke Setup and Check:
1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
  2. Set pump/fan to normal operating mode.

3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
  4. Command valve/damper to open; verify position is full open and adjust output signal as required.
  5. Command valve/damper to a few intermediate positions.
  6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
- I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
1. With full pressure in the system, command valve closed.
  2. Use an ultra-sonic flow meter to detect flow or leakage.

### **3.07 TEST PROCEDURES - GENERAL**

- A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
- B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.
- C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
  2. Sampling is not allowed for:
    - a. Major equipment.
    - b. Life-safety-critical equipment.
    - c. Prefunctional Checklist execution.
  3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
  4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.

5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
  6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
  7. If YY percent of the units in the second sample fail, test all remaining identical units.
  8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.
- D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
- E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.
- F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.
- G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.
- H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.
- I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority's request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
  2. Other points will be monitored by the Commissioning Authority using dataloggers.
  3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.

4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
5. Graphical output is desirable and is required for all output if the system can produce it.
6. Monitoring may be used to augment manual testing.

### **3.08 OPERATION AND MAINTENANCE MANUALS**

- A. See Section 017800 - Closeout Submittals for additional requirements.
- B. Add design intent documentation to manuals prior to submission to the Government.
- C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.
- D. Commissioning Authority will add commissioning records to manuals after submission to the Government.

**END OF SECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of built site elements.
- B. Selective demolition of building elements for alteration purposes.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- D. Section 310200 - Temporary Erosion and Sediment Control.
- E. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- F. Section 017000 - 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.
- G. Section 017419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- H. Section 311000 - Site Clearing: Vegetation and existing debris removal.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - Safety and Health Regulations for Construction Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2019.

**1.04 SUBMITTALS**

- A. Site Plan: Showing:
  - 1. Vegetation to be protected.
  - 2. Areas for temporary construction and field offices.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.

2. Identify demolition firm and submit qualifications.
  3. Include a summary of safety procedures.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

### **1.05 QUALITY ASSURANCE**

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

## **PART 2 PRODUCTS -- NOT USED**

## **PART 3 EXECUTION**

### **3.01 SCOPE**

- A. Visit site prior to bid and verify all existing conditions, existing structures, finishes, and location of work area.
- B. Remove items as indicated within the Contract Documents.
- C. Remove other items indicated, for salvage, relocation, and recycling.

### **3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with other requirements specified in Section 017000.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
1. Obtain required permits.
  2. Use of explosives is not permitted.
  3. 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.
  4. Provide, erect, and maintain temporary barriers and security devices.
  5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  7. Do not close or obstruct roadways or sidewalks without permit.

8. 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.
  9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- C. Do not begin removal until receipt of notification to proceed from Government.
- D. Do not begin removal until built elements to be salvaged or relocated have been removed.
- E. Protect existing structures and other elements that are not to be removed (including adjacent buildings).
1. Provide bracing and shoring.
  2. Prevent movement or settlement of adjacent structures.
  3. Stop work immediately if adjacent structures appear to be in danger.
- F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. If hazardous materials are discovered during removal operations, stop work and notify The Government and Government; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- H. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Comply with requirements of Section 017419 - Waste Management.
  2. Dismantle existing construction and separate materials.
  3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
- I. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface
- J. All adjacent base structures will continue to be occupied during demolition and construction. Contractor shall be required to maintain all dust control measures including, but not limited to, construction of fence mesh and temporary sprinkler throughout construction. During on site storage, all demolished materials shall remain moist to prevent air borne dust accumulation. All debris shall be removed from the project site daily. After daily removal of demolished materials, contractor shall clean storage area and haul route to prevent dust accumulation.
- K. Contractor shall be responsible for and make reparations to any and all damage to existing base components located along the haul route / construction site caused by construction activities. All reparations shall be made prior to Beneficial Occupancy.

### **3.03 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 Government.
- 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 Government.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Existing perforated underdrain pipe:
  - 1. It shall be the contractors responsibility to locate and verify this feature prior to any work. Locations shown on drawings are approximate.
  - 2. Contractor shall take extreme measures to protect the existing perforated underdrain pipe.

### **3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to The Government before disturbing existing installation.
  - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
  - 2. Remove items indicated on drawings.
- C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.

1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
  2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
  3. Verify that abandoned services serve only abandoned facilities before removal.
  4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- D. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
  4. Patch as specified for patching new work.

### **3.05 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 017419 - 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.
- E. All demolished materials shall become the property of the Contractor and shall be removed from the site by the Contractor unless noted otherwise in Contract Documents.
- F. The Contractor shall select haul routes, obtain required approval of local authorities, and conduct its operations in such manner as to insure minimum interference with roads, street, sidewalks, and neighboring buildings and facilities and so that there is no interference with the normal operations of the building.
- G. The Contractor shall obtain all necessary permits and comply with all statutes, ordinances, codes and regulations applicable to the work to be performed.
- H. The Contractor shall take all precautions necessary to assure that the work will be performed in a manner that will not endanger the public, any workman, or any property in the vicinity of the work.

- I. The Contractor shall take such actions as shall be necessary to assure that members of the public will have safe passage on the public streets around the area of demolition, and construct such fencing, barricades and obstacles as will prevent unauthorized entry to the work site.

**END OF SECTION**

**SECTION 033000 - CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete formwork.
- B. Concrete building frame members.
- C. Concrete for composite floor construction.
- D. Floors and slabs on grade.
- E. Concrete reinforcement.
- F. Joint devices associated with concrete work.
- G. Concrete curing.
- H. Materials included in this section shall achieve HPSB Compliance for the following sections:
  - 1. 2-6.1.1 Recycled Content (10%)
  - 2. 2-6.1.2 - Biologically Based Products
  - 3. The contractor is expected to understand the HPSB documentation requirements for these credits and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.
- I. Section 01 3325 - Project Sustainability Summary
- J. Section 01 3329 - Sustainable Design Reporting
- K. Section 07 7419 - Construction Waste Management and Disposal
- L. Section 32 1313 - Concrete Paving

**1.02 REFERENCE STANDARDS**

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete 2016.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).

- F. ACI 305R - Guide to Hot Weather Concreting 2010.
- G. ACI 306R - Guide to Cold Weather Concreting 2016.
- H. ACI 308R - Guide to External Curing of Concrete 2016.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- J. ACI 347R - Guide to Formwork for Concrete 2014, with Errata (2017).
- K. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- L. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.
- M. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- N. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- O. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- P. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2021a.
- Q. ASTM C150/C150M - Standard Specification for Portland Cement 2021.
- R. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2016.
- S. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).
- T. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- U. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019.
- V. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.
- W. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete 2020a.
- X. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.
- Y. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2021.

- Z. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.
- AA. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2020.
- BB. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type) 2011 (Reapproved 2016).
- CC. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop 1974.
- DD. NSF 61 - Drinking Water System Components - Health Effects 2020.

### **1.03 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Verification Samples: Submit sample chips of specified colors indicating pigment numbers and required dosage rates, for subsequent comparison to installed concrete.
- D. Samples: Submit samples of underslab vapor retarder to be used.
- E. Test Reports: Submit report for each test or series of tests specified.
- F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- G. Sustainable Design Submittal: If any fly ash, 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.
- H. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- I. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
- J. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
  - 1. Retain list below with either paragraph above. Edit to suit Project.
  - 2. Cementitious materials and aggregates.

3. Form materials and form-release agents.
  4. Steel reinforcement and reinforcement accessories.
  5. Admixtures.
  6. Waterstops.
  7. Curing materials.
  8. Floor and slab treatments.
  9. Bonding agents.
  10. Adhesives.
  11. Vapor retarders.
  12. Epoxy joint filler.
  13. Joint-filler strips.
  14. Repair materials.
- K. Formwork Shop Drawings: Design and engineering of formwork are Contractor's responsibility.
1. Delete subparagraph below if no shoring and reshoring are required.
  2. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
- L. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- M. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
1. Indicate amounts of mix water to be withheld for later addition at Project site.
- N. Sustainability Submittals, Product data for HPSB Compliance:
1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)

- 1) Total weight of products provided

#### **1.04 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
  1. Maintain one copy of each document on site.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. Installer Qualifications: An experienced installer who has completed concrete Work 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.
- E. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
  1. Delete subparagraph below if not required.
  2. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
- F. Testing Agency Qualifications: An independent testing agency as provided by the Contractor, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548. Retesting if failed test to be provided and paid for by the General Contractor.
  1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- G. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- H. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- I. Refer to Structural Drawings for additional requirements

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

## **1.06 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content. A minimum post-consumer recycled content of 30% is required for reinforcing steel.
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
  - 2. Include statement indicating costs (sell price for each product having recycled content)
  - 3. Total weight of products provided
- B. For products having Biologically Based Products, documentation indicating percentages of Biologically-Based Products.

## **PART 2 PRODUCTS**

### **2.01 FORMWORK**

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
  - 1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance including:
    - a. Plywood, metal, or other approved panel materials.
    - b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      - 1) Select one of four subparagraphs below or revise to suit Project. First imparts glossy finish, second imparts matte finish, and third and fourth impart coarser-textured finish depending on face-ply characteristics.
      - 2) High-density overlay, Class 1, or better.
      - 3) Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
      - 4) Structural 1, B-B, or better, mill oiled and edge sealed.
      - 5) B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
  - 2. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side

for tight fit.

3. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class.  
Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  1. Form-Release agent to contain a minimum Biobased content of 87% per the USDA's standards
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  1. Delete or revise subparagraphs below to suit Project.
  2. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.
  3. Furnish ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in concrete surface.
  4. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## **2.02 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
  1. Type: Deformed billet-steel bars.
  2. Finish: Unfinished, unless otherwise indicated.
- B. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.
  1. Form: Coiled Rolls.
  2. Mesh Size and Wire Gage: As indicated on drawings.
- C. Reinforcement Accessories:
  1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
  - a. Provide solid concrete bricks to support bottom mats of spread footings and bottom bars in grade beams where rebar support will be in direct contact with soil. Concrete brick sizes as required to provide specified concrete cover.
  - b. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
3. Joint Dowel Bars: Plain-steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
- B. Fine and Coarse Aggregates: ASTM C 33.
  1. Nominal Maximum Aggregate Size: 3/4 inch (19 mm).
- C. Fly Ash: ASTM C618, Class C or F.
- D. Calcined Pozzolan: ASTM C618, Class N.
- E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- F. Water: Clean and not detrimental to concrete.

### **2.04 ADMIXTURES**

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

### **2.05 ACCESSORY MATERIALS**

- A. Underslab on Grade Vapor Retarder
  1. Performance-Based Specification: Vapor retarder membrane shall be manufactured from virgin polyolefin resins, and when tested according to all

requirements of ASTM E1745, shall meet the following minimum performance requirements: Install per manufacturer's recommendations. Tape all joints and waterproof seal all penetrations.

- a. Thickness: 15 mill
  - b. 0.0063 Perm, Water Vapor Permeance in accordance with ASTM E-96
  - c. Greater than 3200 Gram Puncture Resistance in accordance with ASTM D 1709 Method B
  - d. 72.61 (12.61) Lb. Force/Inch (kN/m) Tensile Strength per ASTM E 154 Section 9
  - e. 0.0052 Perm Water Vapor Permeance After Wetting Out Drying Out and After Long-Term Soaking per ASTM E-154 Section 8 and ASTM E-96 Procedure B
  - f. 0.0057 Perm Water Vapor Permeance Resistance to Plastic Flow and Elevated Temperature per ASTM E-154 Section 11 and ASTM E-96 Procedure B
  - g. 0.0052 Perm Water Vapor Permeance Effect Low Temperature and Flexibility ASTM E-154, Section 12 ASTM E-96, Procedure B
  - h. 0.0052 Perm Water Vapor Permeance Resistance to Deterioration From Organisms and Substances in Contacting Soil ASTM E-154, Section 13 ASTM E-96 Procedure B
  - i.  $8.7 \times 10^{-9}$  Radon Transmittance (m/s) k124/02/95
  - j.  $3.3 \times 10^{-12}$  Radon Coefficient (m<sup>2</sup>/s)
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch (48 MPa).

## **2.06 BONDING AND JOINTING PRODUCTS**

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
- B. Epoxy Bonding System:
  1. Two-component epoxy resin, capable of humid curing and bonding to damp surfaces.
  2. Class and grade to suit requirements, and as follows:

- a. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- C. Waterstops: Rubber, complying with COE CRD-C 513.
  1. Factory fabricate corners, intersections, and directional changes.
  2. Profile: Flat, dumbbell with center bulb.
- D. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
  1. Fabricate reglets of not less than 0.0217-inch- (0.55-mm-) thick galvanized steel sheet.
- E. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.
- F. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard, felt, or cork, complying with ASTM D 1751, 1/4 inch thick (6 mm thick) and 4 inches deep (200 mm deep); tongue and groove profile.
- G. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- H. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.
- I. Sealant and Primer: As specified in Section 079005.

## **2.07 CURING MATERIALS**

- A. Moisture-Retaining Sheet: ASTM C171.
  1. Polyethylene film, clear, minimum nominal thickness of 0.0040 inch (0.10 mm).
  2. White-burlap-polyethylene sheet, weighing not less than 10 ounces per linear yard, 40 inches wide (305 g/sq m).
- B. Evaporation Retarder:
  1. Waterborne, monomolecular film forming retarder manufactured for application to fresh concrete.
  2. Provide product meeting the recommendations of the following American Institute Publications:
    - a. ACI 302 Guide for Concrete Floor and Slab Construction

- b. ACI 308 Guide to Curing Concrete
  - c. ACI 305 Recommended Practices for Hot Weather Concreting
  - d. ACI 345 Guide for Concrete highway Bridge and Deck Construction.
- C. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- E. Curing Compound:
- 1. Water-based acrylic curing and sealing compound with the following characteristics:
    - a. AASHTO M148 Type 1, Class A and B
    - b. ASSTM C309 Type 1, Class A and B
    - c. Maximum VOC content of 20 g/L
    - d. Tested per CDPH/EHLB Standard Method V1.2-2017 Emission Testing Method
  - 2. Install in accordance with manufacturer's recommendations and at a rate of +/- 200 square feet per gallon.
- F. Curing Compound:
- 1. Water-based acrylic curing and sealing compound with the following characteristics:
    - a. 1. AASHTO M148 Type 1, Class A and B
    - b. 2. ASSTM C309 Type 1, Class A and B
    - c. 3. Maximum VOC content of 20 g/L
    - d. 4. Tested per CDPH/EHLB Standard Method V1.2-2017 Emission Testing Method
  - 2. Install in accordance with manufacturer's recommendations and at a rate of +/- 200 square feet per gallon.
- G. Water: Potable, not detrimental to concrete.

## **2.08 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.
- B. 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 qualified, independent testing agency acceptable to The Government for preparing and reporting proposed mix designs.
- C. Footings and Retaining Walls Piers: Proportion normal-weight concrete mix as follows:
1. Compressive Strength (28 Days): 3000 psi (20.7 MPa).
  2. Maximum Slump: 4 inches (100 mm).
  3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches (200 mm) after admixture is added to concrete with 2- to 3-inch (50- to 100-mm) slump.
- D. Slab-on-Grade and slab over metal deck: Proportion normal-weight concrete mix as follows:
1. Compressive Strength (28 Days): 3000 psi (20.7 MPa).
  2. Maximum Slump: 4 inches (100 mm).
- E. Suspended Slabs, Beams, and Columns: Proportion normal-weight concrete mix as follows:
1. Compressive Strength (28 Days): 3000 psi.
  2. Maximum Slump: 4 inches (100 mm).
- F. Outside Porches and Associated Concrete: Proportion normal-weight concrete mix as follows:
1. Compressive Strength (28 Days): 3000 psi (34.5 MPa).
  2. Maximum Slump: 4 inches (100 mm).
  3. Provide air entrainment per ACI standards to meet ASTM C260
- G. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.
- H. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 20 percent.
- I. Maximum Water-Cementitious Materials Ratio: 0.53 for concrete with a 28 day compressive strength of  $F'c = 3000$  psi.
- J. Maximum Water-Cementitious Materials Ratio: 0.45 for concrete with a 28 day compressive strength of  $F'c = 4000$  psi.
- K. Limit water - soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- L. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 4 to 6 percent, unless otherwise indicated.
- M. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
  1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

## **2.09 REPAIR MATERIALS**

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
  1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
  4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## **2.10 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.
  1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature

is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent.
- C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- D. 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.
  - 2. Use latex bonding agent only for non-load-bearing applications.
- E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- F. Ensure vapor barrier is installed in accordance with project specifications prior to placing concrete. Refer to division 07.

#### **3.03 FORMWORK**

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Select surface classes, usually two or more, from subparagraphs below. Indicate where each class applies. Classes are taken from ACI 347R. See Evaluations.
  - 2. Class A, 1/8 inch (3 mm).

- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
  - 1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### **3.04 REMOVING AND REUSING FORMS**

- A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
  - 1. At least 75 percent of 28-day design compressive strength.
- C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

- D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched or damaged forms for concrete surfaces unless approved by the Government.

### **3.05 EMBEDDED ITEMS**

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor bolts, accurately located, to elevations required.
  - 2. Select applicable subparagraphs below and add others if required. Revise to suit Project.
  - 3. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 4. Install dovetail anchor slots in concrete structures as indicated and required.

### **3.06 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor barrier. Repair damage and reseal vaporbarrier before placing concrete. Refer to division 07.
- B. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- C. Install welded wire reinforcement in maximum possible lengths on bar supports spaced to minimize sagging and offset end laps in both directions. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- D. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.
  - 1. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

### **3.07 VAPOR RETARDERS**

- A. Vapor Retarder: Refer to Division 7 and paragraph 2.05 of this section.

- B. Granular Fill: Cover compacted subgrade with granular fill, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

### **3.08 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify The Government not less than 48 hours prior to commencement of placement operations.
- D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### **3.09 SLAB JOINTING**

- A. Locate joints as indicated on 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. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- E. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by the Government.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of slabs on grade.
  - 2. Form from preformed, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
  - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- F. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
- G. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  2. Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
  3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- H. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.
1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

### **3.10 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. Maximum Variation of Surface Flatness:
1. Exposed Concrete Floors: 1/4 inch (6 mm) in 10 feet (3 m).
  2. Under Seamless Resilient Flooring: 1/4 inch (6 mm) in 10 feet (3 m).
  3. Under Carpeting: 1/4 inch (6 mm) in 10 feet (3 m).
- B. Correct the slab surface if tolerances are less than specified.
- C. 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.

### **3.11 WATERSTOPS**

- A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

### **3.12 CONCRETE PLACEMENT**

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by the Government.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
  - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
  - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### **3.13 CONCRETE FINISHING**

#### **A. Finishing Formed Surfaces**

1. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
  - a. Apply to concrete surfaces of retaining walls to be covered with earth backfill.
2. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of

seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm) in height.

- a. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
  - b. Do not apply rubbed finish to smooth-formed finish.
3. Rubbed Finish: Apply the following to smooth-formed finished concrete:
    - a. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
  4. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

#### **B. Finishing Floors and Slabs**

1. General: Comply with recommendations in ACI 302.1R for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
2. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
  - a. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
3. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - a. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system

- b. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:
  - 1) Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.
  - 2) For slab on grade areas receiving thin set tile, the overall minimum values of flatness shall be, F(F) 50 and the levelness, F(L) 35. Local values of flatness shall be, F(F) 35, and levelness, F(L) 20.
4. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

### **3.14 MISCELLANEOUS CONCRETE ITEMS**

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

### **3.15 CURING AND PROTECTION**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. 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 (1 kg/sq. m 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.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other

surfaces, by one or a combination of the following methods:

1. **Moisture Curing:** Keep surfaces continuously moist for not less than seven days with the following materials:
  - a. Water.
  - b. Continuous water-fog spray.
  - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
2. **Moisture-Retaining-Cover Curing:** Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
3. **Curing Compound:** Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

### **3.16 LIQUID FLOOR TREATMENTS**

- A. **Penetrating Liquid Floor Treatment:** Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
  1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  2. Do not apply to concrete that is less than seven days old.
  3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

### **3.17 JOINT FILLING**

- A. **Prepare, clean, and install joint filler** according to manufacturer's written instructions.
  1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

### **3.18 FIELD QUALITY CONTROL**

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements: All retesting as a result of failed test to be provided by and paid for by the General Contractor.
  - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
  - 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
  - 5. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
  - 6. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimens at 7 days and two at 28 days. Hold fourth specimen for future specimen for future testing if required. Discard if not required.
    - a. The contractor shall engage a qualified independent testing laboratory to make, field cure, and test standard cylinder specimens. The results of these tests shall be used by the contractor to evaluate field curing and for form removal.
    - b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide

- corrective procedures for protecting and curing in-place concrete.
- D. Strength of each concrete mix 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 (3.4 MPa).
  - E. Test results shall be reported in writing to the Government, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
  - F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by the Government but will not be used as sole basis for approval or rejection of concrete.
  - G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by the Government. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by the Government.

### **3.19 CONCRETE SURFACE REPAIRS**

- A. Defective Concrete: Repair and patch defective areas when approved by the Government. Remove and replace concrete that cannot be repaired and patched to the Government's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match

surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by the Government.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  5. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  6. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to the Government's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to the Government's approval.

- G. Test Results: The testing agency shall report test results in writing to The Government and Contractor within 24 hours of test.
- H. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- I. Repair or replacement of defective concrete will be determined by the The Government. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- J. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of The Government for each individual area.

### **3.20 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

**END OF SECTION**

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**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete Block.
- B. Concrete facing brick.
- C. Clay Facing Brick.
- D. Mortar and Grout. Provide new masonry joints to match existing and point up existing masonry joints as required for fully restored brick.
- E. Reinforcement and Anchorage.
- F. Flashings.
- G. Lintels.
- H. Accessories.
- I. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary.
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 74 19 - Construction Management and Disposal
- E. Section 04 7200 - Cast Stone Masonry
- F. Section 055000 - Metal Fabrications: Loose steel lintels.
- G. Section 061000 - Rough Carpentry: Nailing strips built into masonry.
- H. Section 072100 - Thermal Insulation: Insulation for cavity spaces.
- I. Section 07 8401 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- J. Section 076200 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.

**1.03 REFERENCE STANDARDS**

- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

- B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2008.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- E. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement 2016, with Editorial Revision (2018).
- F. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale) 2017.
- G. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile 2017.
- H. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2016a.
- I. ASTM C91/C91M - Standard Specification for Masonry Cement 2018.
- J. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units 2017.
- K. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units 2021.
- L. ASTM C150/C150M - Standard Specification for Portland Cement 2021.
- M. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.
- N. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale) 2021.
- O. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019.
- P. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- Q. ASTM C476 - Standard Specification for Grout for Masonry 2020.
- R. ASTM C744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units 2016.
- S. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2020.
- T. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.

U. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls 2017.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

#### **1.05 SUBMITTALS**

A. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

B. Samples: Submit four samples of face brick, decorative block, and face brick units to illustrate color, texture, and extremes of color range.

C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

D. Maintenance Materials: Furnish the following for Government's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.

E. Sustainability Submittals, Product data for HPSB Compliance:

1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

a. Include statement indicating costs (sell price for each product having recycled content)

b. Total weight of products provided

#### **1.06 MOCK-UP**

A. Construct a masonry wall as a mock-up panel a minimum of 8'-0" x 8'-0"; include mortar and accessories, structural backup, wall openings, flashings, and wall insulation in mock-up, and other materials. Provide repurposed masonry samples as required and approved by the Government.

B. Mock-up may remain as part of the Work.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

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

#### **1.08 SUSTAINABILITY REQUIREMENTS**

A. Contractor shall endeavor to provide materials with a high recycled content

1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
2. Include statement indicating costs (sell price for each product having recycled content)
3. Total weight of products provided

## **PART 2 PRODUCTS**

### **2.01 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on drawings for specific locations.
  2. Grade in Special Shapes: Provide non-standard blocks configured for corners.
  3. Load-Bearing Units: ASTM C90, normal weight.
    - a. Hollow block, as indicated.
    - b. Exposed Faces: Manufacturer's standard color and texture where indicated.
  4. Non-Loadbearing Units: ASTM C129.
    - a. Hollow block.
  5. Bullnosed CMU: Provide radiused edge exposed CMU at outside vertical corners, all except first course above finished floor and course at ceiling/all intersection, provide square outside corner edge.

### **2.02 BRICK UNITS**

- A. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
1. Color and texture to match The Government's sample.
  2. Color and texture: Shall be Equal to the brick found on surrounding buildings on base..
  3. Nominal size: As indicated on drawings.
  4. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

### **2.03 MORTAR AND GROUT MATERIALS**

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.

- B. Grout Aggregate: ASTM C404.
- C. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
  - 1. Color(s): Color to be selected by the Government from manufacturer's full range of colors as required to match architects sample.

#### **2.04 REINFORCEMENT AND ANCHORAGE**

- A. Manufacturers:
  - 1. Reputable manufacturer engaged in the manufacturing of masonry reinforcing and anchorage systems for a minimum of 10 years.
- B. Reinforcing Steel: ASTM A615/A615M Grade 60 (420) deformed billet bars.
- C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated. Size to provide not more than 1 inch (25 mm) and not less than 1/2 inch of mortar coverage from masonry face. Hot dipped galvanized.
- D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Truss or ladder. 16" on center vertically.
  - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
  - 3. Size: 0.1875 inch (4.8 mm) side rods with 0.1875 inch (4.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.
- E. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Truss, with adjustable ties or tabs spaced at 16 in (406 mm) on center vertically and with adjustable eyelets and pentel veneer ties equal to 2xhook-16" o.c. horizontally.
  - 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
  - 3. Size: 0.1875 inch (4.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods and adjustable components of 0.1875 inch (4.8 mm) wire, width of components as required to provide not less than 5/8 inch (16 mm) of mortar coverage from each masonry face.
  - 4. Vertical adjustment: Not more than 1 1/4 inches (32 mm).
- F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch (25 mm) and not

less than 1/2 inch (13 mm) of mortar coverage from masonry face.

1. Concrete frame: Dovetail anchors of bent steel strap, nominal 1 inch (25 mm) width x 0.024 in (0.61 mm) thick, with trapezoidal wire ties 0.1875 inch (4.75 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
  2. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch (6.3 mm) thick, with trapezoidal wire ties 0.1875 inch (4.75 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
- G. 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 (1.91 mm) 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 (4.75 mm) thick.
  3. Vertical adjustment: Not less than 3 inches (76 mm).
  4. Provide screw pullout hold load per manufacturers requirement for back-up material. Note pullout information on submittal.

## **2.05 FLASHINGS**

- A. Thru Wall Flashing - Refer to Division 07.

## **2.06 ACCESSORIES**

- A. Preformed Control Joints: Polyvinyl chloride material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; maximum lengths available.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
- D. Weeps:
1. Polypropylene Weep:
    - a. Honeycomb design
    - b. Polypropylene material tested in accordance with ASTM D2240, D790B, D638, and D1238B

- c. Size: 3/8" thickness x height and depth necessary to fill entire joint of masonry construction of which it is installed. Provide custom sizes if necessary.
2. Tube Weep: 3/8" diameter clear plastic tube weep.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials as recommended by brick and mortar manufacturer..
- F. Where horizontal reinforcement is specified, provide prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
- G. Stainless Steel Termination Bar install continuous termination bar - refer to Section 07 6500.

## **2.07 MORTAR AND GROUT MIXES**

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
  1. Masonry below grade and in contact with earth: Type S.
  2. Exterior, loadbearing masonry: Type S.
  3. Exterior, non-loadbearing masonry: Type S.
  4. Interior, loadbearing masonry: Type S.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match The Government'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 (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm). Provide 28 day compressive strength indicated on drawings.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 PREPARATION**

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

### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

### **3.04 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
  - 3. Mortar Joints: Concave.
- D. Brick Units:
  - 1. Bond: As indicated for different locations. Flemish bond unless noted otherwise.
  - 2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
  - 3. Mortar Joints: Concave.
  - 4. At existing Admin Building: Match existing bond patten, coursing, and mortar joints.

### **3.05 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.

- E. Interlock intersections and external corners, except for units laid in stack bond.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

### **3.06 WEEPS/CAVITY VENTS**

- A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and at top of walls for ventilation.
- B. Provide top of wall weeps at 24" on center horizontally. Locate as indicated on the drawings and at the top of all masonry veneer air space cavities as directed by the Government. Locate at consistent elevations within 8" of the top of the masonry cavities.
- C. Install cavity vents in veneer and cavity walls at 32 inches (800 mm) on center horizontally below shelf angles and lintels and near top of walls.

### **3.07 CAVITY MORTAR CONTROL**

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar control panels continuously throughout exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions. Verify that airspace width is no more than 3/8 inch (9 mm) greater than panel thickness. Install horizontally between joint reinforcement. Stagger end joints in adjacent rows. Fit to perimeter construction and penetrations without voids.

### **3.08 REINFORCEMENT AND ANCHORAGE - GENERAL**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.

- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches (150 mm).
- D. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.
- E. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

### **3.09 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY**

- A. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- B. Lap joint reinforcement ends minimum 6 inches (150 mm).

### **3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches (150 mm).
- D. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches (400 mm) on center vertically and 16 inches (400 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 16 inches (400 mm) on center.

### **3.11 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY**

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of openings.
- C. Lap joint reinforcement ends minimum 6 inches (150 mm).
- D. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches (600 mm) horizontally and 16 inches (400 mm) vertically.

### **3.12 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY**

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.

- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches (150 mm).
- D. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 16 inches (400 mm) horizontally and 16 inches (400 mm) vertically.

### **3.13 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
- B. Refer to Division 7 for flashing requirements.

### **3.14 LINTELS**

- A. Install loose steel lintels over openings of size required for loading if not specified otherwise.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.

### **3.15 GROUTED COMPONENTS**

- A. Reinforce bond beams with 2 scheduled bars, 1 inch (25 mm) from bottom web.
- B. Lap splices minimum 24 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 12 inches (300 mm) either side of opening.
- F. Do not continue horizontal joint reinforcement through control or expansion joints.

### **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 (300 mm) from framed openings, unless noted otherwise.

- D. 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 (6 mm).
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.
- D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

### **3.18 CUTTING AND FITTING**

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

### **3.19 FIELD QUALITY CONTROL**

- A. The Contractor shall employ an independent testing agency to complete the following tests. Refer to section 01 4000 - Quality Requirements for additional requirements.
  - 1. 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.
  - 2. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
  - 3. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

### **3.20 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.

**3.21 PROTECTION**

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

**END OF SECTION**

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**SECTION 051200 - STRUCTURAL STEEL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural steel framing members.
- B. Base plates, shear stud connectors and expansion joint plates.
- C. Grouting under base plates.
- D. Structural steel rails for elevator.
- E. Materials included in this section shall meet the standards for High Performance Sustainable Buildings for the following sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 052100 - Steel Joist Framing.
- D. Section 053100 - Steel Decking: Support framing for small openings in deck.
- E. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.

**1.03 REFERENCE STANDARDS**

- A. AISC (MAN) - Steel Construction Manual 2017.
- B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges 2016.
- C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished 2018.
- F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

- G. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel 2013 (Reapproved 2018).
- H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- I. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength 2014.
- J. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric) 2014.
- K. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021.
- L. ASTM A992/A992M - Standard Specification for Structural Steel Shapes 2020.
- M. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021.
- N. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- O. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.
- P. ASTM F436 - Standard Specification for Hardened Steel Washers 2011.
- Q. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners 2013.
- R. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
- S. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
  - 2. Indicate cambers and loads.

3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- D. Sustainability Submittals:
  1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Total weight of products provided.

### **1.05 QUALITY ASSURANCE**

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Maintain one copy of each document on site.
- C. Fabricator: AISC Certified Company specializing in performing the work of this section with minimum 5 years of documented experience.
- D. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- E. Design of connections not detailed on the drawings shall be the responsibility of the fabricator. Proposed connections shall be submitted to the engineer of record in the the State in which the Project is located for review.
- F. Refer to Structural Drawings for additional requirements
- G. Sustainability Submittals, Product data for HPSB Compliance:
  1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Include total weight of products provided

### **1.06 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content.
  1. A minimum post-consumer recycled content of 30% is required.

2. For products having recycled content, provide documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Rolled Steel Structural Shapes: ASTM A992/A992M.
- D. Steel Shapes, Plates, and Bars: ASTM A242/A242M high-strength, corrosion-resistant structural steel.
- E. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- F. Steel Sheet: ASTM A1011/A1011M, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.
- G. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- H. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 or ASTM A325M, Type 1, medium carbon, galvanized, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436 washers.
- I. Headed Anchor Rods: ASTM F 1554 Grade 36, plain.
- J. Load Indicator Washers: Provide washers complying with ASTM F959 at connections requiring high-strength bolts.
- K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- L. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107/C 1107M and capable of developing a minimum compressive strength of 7,000 psi (48 MPa) at 28 days.
- M. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- N. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- O. Provide and coordinate structural steel steel requirements by elevator manufacturer. Provide additional steel supports where not shown on drawings as required for installation of fully functioning elevator.

### **2.02 FABRICATION**

- A. Shop fabricate to greatest extent possible.

- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Develop required camber for members.

### **2.03 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.

### **2.04 SOURCE QUALITY CONTROL**

- A. Provide shop testing and analysis of structural steel.
- B. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
- C. Welded Connection: Visually inspect all shop-welded connections. Perform ultrasonic or radiographic test on all full penetration (CJP) and groove welds.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

### **3.02 ERECTION**

- A. Erect structural steel in compliance with AISC S303 "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. Do not field cut or alter structural members without approval of The Government.
- D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- E. 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.

### **3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

### **3.04 FIELD QUALITY CONTROL**

- A. The Contractor shall employ an independent testing agency to complete the following tests. Refer to section 01 4000 - Quality Requirements for additional requirements.
1. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", testing at least 25 percent of bolts at each connection. Visually inspect all bolts for snug tight condition.

**END OF SECTION**

**SECTION 052100 - STEEL JOIST FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Open web steel joists and shear stud connectors, with bridging, attached seats and anchors.
- B. Supplementary framing for floor and roof openings greater than 18 inches (450 mm).
- C. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 051200 - Structural Steel Framing: Superstructure framing.
- F. Section 053100 - Steel Decking: Support framing for openings less than 18 inches (450 mm) in decking.
- G. Section 055000 - Metal Fabrications: Non-framing steel fabrications attached to joists.

**1.03 REFERENCE STANDARDS**

- A. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.

- E. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry 2018.
- F. ASTM E709 - Standard Guide for Magnetic Particle Testing 2021.
- G. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2014 (Amended 2015).
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
- I. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections 2014, with Errata (2015).
- J. SJI (SPEC) - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders 2011.
- K. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders 2008.
- L. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 1999 (Ed. 2004).

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.
- C. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

#### **1.05 QUALITY ASSURANCE**

- A. Perform Work, including that for headers and other supplementary framing, in accordance with SJI (SPEC) Standard Specifications Load Tables and SJI Technical Digest No. 9.
  - 1. Maintain one copy of document on site.
- B. Erector Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.
- C. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Include total weight of products provided

## **1.06 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content:
  - 1. A minimum post-consumer recycled content of 30% is required.
  - 2. For products having recycled content, provide documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

## **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Transport, handle, store, and protect products to SJI requirements.
- B. Contractor shall endeavor to provide materials with a high recycled content. A minimum post-consumer recycled content of 30% is required.a. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Open Web Joists: SJI Type K Joists:
  - 1. Provide bottom chord extensions as indicated.
  - 2. End bearing of 4 inches (100 mm) on masonry supports, unless shown otherwise.
  - 3. Finish: Shop primed.
- B. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.
- C. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

### **2.02 FABRICATION**

- A. Frame special sized openings in joist web framing, if indicated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.

### **3.02 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. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- D. Install supplementary framing for floor and roof openings greater than 8 inches (<> mm), unless shown otherwise on drawings.
- E. 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.
- F. Do not field cut or alter structural members without approval of joist manufacturer.
- G. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed , except surfaces specified not to be primed.

### **3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm).
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

### **3.04 FIELD QUALITY CONTROL**

- A. The Contractor shall employ an independent testing agency to complete the following tests. Refer to section 01 4000 - Quality Requirements for additional requirements.
  - 1. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least 20 percent of bolts at each connection.
  - 2. Welded Connections: Visually inspect all field-welded connections and test at least 5 percent of welds using one of the following:
  - 3. Radiographic testing performed in accordance with ASTM E94.
  - 4. Ultrasonic testing performed in accordance with ASTM E164.
  - 5. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
  - 6. Magnetic particle inspection performed in accordance with ASTM E709.

**END OF SECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof deck.
- B. Supplementary framing for openings up to and including 18 inches (450 mm).
- C. Bearing plates and angles.
- D. Form deck.
- E. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 033000 - Cast-in-Place Concrete: Concrete topping over metal deck.
- F. Section 04 2000 - Unit Masonry Assemblies: Placement of anchors for bearing plates embedded in unit masonry assemblies.
- G. Section 051200 - Structural Steel Framing: Support framing for openings larger than 18 inches (450 mm) and shear stud connectors.
- H. Section 052100 - Steel Joist Framing: Support framing for openings larger than 18 inches (450 mm) and shear stud connectors.
- I. Section 055000 - Metal Fabrications: Steel angle concrete stops at deck edges.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished 2018.

- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
- G. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel 2018.
- H. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks 2007.
- I. UL (FRD) - Fire Resistance Directory Current Edition.

#### **1.04 SUBMITTALS**

- A. See Section - 01 3001 Submittals for submittal procedures
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- D. Certificates: Certify that products furnished meet or exceed specified requirements.
- E. Submit manufacturer's installation instructions.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
- G. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Include total weight of products provided

#### **1.05 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content.

1. A minimum post-consumer recycled content of 30% is required.
2. For products having recycled content, provide documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

### **1.06 QUALITY ASSURANCE**

- A. Design deck layout, spans, fastening, and joints in accordance with manufacturers written recommendations in and for the the State in which the Project is located for project conditions.
- B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

### **1.07 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.
- C. Contractor shall endeavor to provide materials with a high recycled content. A minimum post-consumer recycled content of 30% is required.a. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

## **PART 2 PRODUCTS**

### **2.01 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 of span.
  4. Maximum Vertical Deflection of Form Deck: 1/360 of span.
- B. Roof Deck: Non-composite type, fluted steel sheet:
  1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
  2. Structural Properties:
    - a. See structural drawings.
  3. Minimum Metal Thickness, Excluding Finish: As noted on drawings.
  4. Nominal Height: 1-1/2 inch (38 mm).

5. Profile: Fluted; SDI WR.
  6. Side Joints: Lock seam or nested
  7. End Joints: Lapped, welded.
  8. Refer to Structural Drawings for additional requirements
- C. Metal Form Deck: Corrugated sheet steel, with provision for ventilation of concrete:
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.
  3. Refer to Structural Drawings for additional requirements

## **2.02 ACCESSORY MATERIALS**

- A. Bearing Plates and Angles: ASTM A36/A36M steel unfinished.
- 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. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- F. Flute Closures: Closed cell foam rubber, 1 inch (25 mm) thick; profiled to fit tight to the deck.

## **2.03 FABRICATED DECK ACCESSORIES**

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage (0.8 mm) thick sheet steel for roof and 20 gage for floor; of profile and size as indicated; finished same as deck.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.

### **3.02 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 (100 mm) bearing.

- C. On steel supports provide minimum 2 inch bearing.
- D. Fasten deck to steel support members at ends and intermediate supports at 12 inches (300 mm) 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. Place and secure special deep fluted sections for integral concrete bridging.
- E. Clinch lock seam side laps, where applicable..
- F. At mechanically fastened male/female side laps fasten at 24 inches (600 mm) on center maximum.
- G. At welded male/female side laps weld at 18 inches (450 mm) on center maximum.
- H. Weld deck in accordance with AWS D1.3/D1.3M.
- I. At deck openings from 6 inches (150 mm) to 10 inches (254 mm) in size, provide 2 x 2 x 1/4 inch (50 x 50 x 6 mm) steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
  - 1. See structural drawings for openings larger than 10 inches.
- J. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch (150 mm) minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches (300 mm) on center maximum.
- K. 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.
- L. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- M. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- N. Position roof 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.

**END OF SECTION**

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**SECTION 054000 - COLD-FORMED METAL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formed steel stud exterior wall framing.
- B. Exterior wall sheathing (gypsum sheathing).
- C. Formed steel joist, purlin, and rafter framing and bridging as indicated on drawings.
- D. Metal framing system for exterior metal soffits.
- E. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 042001 - Masonry Veneer: Veneer masonry supported by wall stud metal framing.
- F. Section 053100 - Steel Decking.
- G. Section 07 9005 - Joint Sealers
- H. Section 09 2116 Gypsum Board Assemblies: Gypsum Based Sheathing
- I. Section 061000 - Rough Carpentry: Wood blocking and miscellaneous framing.
- J. Section 04 2000 - Unit Masonry
- K. Section 04 7200 - Cast Stone Masonry
- L. Section 072500 - Weather Barriers: Weather barrier over sheathing.
- M. Section 079005 - Joint Sealers.
- N. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

- O. Section 07 4213 - Ribbed Metal Wall Panel
- P. Section 07 4214 - Insulated Metal Plate Wall Panels.

### **1.03 REFERENCE STANDARDS**

- A. 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)
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members 2018, with Editorial Revision.
- E. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.

### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

### **1.05 SUBMITTALS**

- A. See Section - 01 3001 Submittals for submittal procedures
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
  - 1. Indicate stud and ceiling joist and rafter layout.
  - 2. Describe method for securing studs to tracks and for bolted framing connections.
  - 3. Provide details and calculations for factory-made framing connectors.
- D. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

- a. Include statement indicating costs (sell price for each product having recycled content)
- b. Total weight of products provided

### **1.06 QUALITY ASSURANCE**

- A. **Manufacturer Qualifications:** Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- B. **Installer Qualifications:** Company specializing in performing the work of this section with minimum three years documented experience.

### **1.07 MOCK-UP**

- A. Construct a masonry and metal panel wall as a mock-up panel sized and as indicated on drawings; include mortar and accessories, structural backup, wall openings, flashings, and wall insulation in mock-up, and other materials. Provide repurposed masonry samples as required and approved by the Government.
- B. Mock up may not remain as part of the Work. Locate mockup adjacent to job trailer. Mockup will serve as the standard for expected quality of masonry work for the duration of the project.

### **1.08 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content.
- B. A minimum post-consumer recycled content of 30% is required.
  1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

## **PART 2 PRODUCTS**

### **2.01 FRAMING SYSTEM**

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Deliver to site in largest practical sections.
- C. Metal framing as required for exterior metal soffit system.

### **2.02 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. All tracks shall be 16 gage minimum. Minimum stud depth and gage shall be indicated on structural drawings. All 16 gage and heavier studs shall be 50 ksi material.
- B. Framing Connectors: Factory-made, formed steel sheet.
  1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch (3.42 mm), and factory punched holes and slots.
  2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
  3. 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.
  4. Rafters: Unpunched structural studs with properties indicated on drawings.

### **2.03 WALL SHEATHING (GYPSUM SHEATHING)**

- A. Wall Sheathing: Glass mat faced gypsum; ASTM C 1177/C 1177M, square long edges, 5/8 inch Type X fire-resistant (16 mm Type X fire-resistant). Comply with all governing authorities.

### **2.04 ACCESSORIES**

- A. Bracing, Furring, Bridging: Formed sheet steel, match stud thickness unless noted on drawings; finish to match framing components.

### **2.05 FASTENERS**

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

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

### **3.02 INSTALLATION OF STUDS**

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches (600 mm) on center unless noted otherwise. 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. Install intermediate studs above and below openings to align with wall stud spacing.
- G. Attach cross studs to studs for attachment of fixtures anchored to walls.
- H. Install framing between studs for attachment of mechanical and electrical items, and bridging to prevent stud rotation and buckling.
- I. Touch-up field welds and damaged galvanized surfaces with primer.

### **3.03 INSTALLATION OF JOISTS, PURLINS, and RAFTERS**

- A. Install framing components in accordance with manufacturer's instructions and drawings.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.

### **3.04 WALL SHEATHING (GYPSUM SHEATHING)**

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
  - 1. Provide steel diagonal bracing at corners.

**END OF SECTION**

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**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel and aluminum items.
- B. Downspout boots.
- C. Ladder
- D. Bollards , fixed and removable, with chains
- E. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. F. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 033000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- F. Section 042000 - Unit Masonry: Placement of metal fabrications in masonry.
- G. Section 055213 - RAILINGS & GUARDS.
- H. Section 06 2000 - Finish Carpentry
- I. Section 099113 - Exterior Painting: Paint finish.
- J. Section 099123 - Interior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements 2018.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.

- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- G. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength 2014.
- H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021.
- I. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2014.
- J. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- K. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
- M. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.
- D. Sustainability Submittals, Product data for HPSB Compliance:

1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
2. Include statement indicating costs (sell price for each product having recycled content)
  - a. Total weight of products provided

### **1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Welding: Qualify procedures and personnel according to the following:
  1. AWS D1.1, "Structural Welding Code--Steel."

### **1.06 PROJECT CONDITIONS**

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

### **1.07 COORDINATION**

- A. Coordinate installation of anchorages for metal fabrications. 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.

### **1.08 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content. A minimum post-consumer recycled content of 30% is required.
  1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.

### **1.09 MATERIALS - STEEL**

- A. Steel Sections: ASTM A 36/A 36M.

- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A 53/A 53M Grade B Schedule 40, black finish.
- E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- F. Slotted Channel Fittings: ASTM A1011/A1011M.
- G. Fasteners:
  - 1. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and for both interior and exterior use where fastening into fire-retardant treated wood. Provide Zinc-plated fasteners with coating complying with ASTM B633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, class, and substrate required.
  - 2. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
  - 3. Anchor Bolts: ASTM F 1554, Grade 36.
  - 4. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
  - 5. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
  - 6. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).
  - 7. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).
  - 8. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below 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.
    - a. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
    - b. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).
  - 9. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.
- 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 needed, hot-dip galvanized per ASTM A 153/A 153M.
- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- J. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- K. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

### **1.10 MATERIALS - ALUMINUM**

- A. Provide aluminum screen and related accessories as noted on drawings to include:
  1. Angles
  2. Perforated Panels
  3. Aluminium Bolts
- B. Prefabricate to the greatest extent possible, submit detailed shop drawings for written approval prior to construction. Refer to drawings for additional information.

### **1.11 FABRICATION**

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

### **1.12 FABRICATED ITEMS**

- A. Bollards: Fixed Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish. Removeable Bollards, steel, as detailed, prime , paint finish

- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
  - 1. Refer to specification 09 9672 Fluid Applied Insulative Coatings for additional instruction.
- C. Lintels: As detailed; galvanized finish.
  - 1. Refer to specification 09 9672 Fluid Applied Insulative Coatings for additional instruction.
- D. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.
- E. Downspout Boots with cleanout :
  - 1. Provide cast iron boots, at all downspouts with stainless steel anchors as required. Coordinate height required with actual location of storm drainage line and finished grade. Install boots with top elevation at 18:"above finished grade. Coordinate inlet size and discharge size with downspout and storm drain pipe sizing installed on site and all other applicable trades. Install per manufacturers' instructions.
  - 2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum
  - 3. Coordinate with Civil storm pipe size and Downspout size
  - 4. Color to be selected by the Government from manufacturer's standard range
  - 5. Configuration:
    - a. Square downspout to round discharge.
    - b. Cast Iron. ASMT A48
    - c. Paint all down spout boots. Color as direted by the Government.

### **1.13 GROUT**

- A. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- B. 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.

### **1.14 FINISHES - STEEL**

- A. Prime paint steel items.

- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

### **1.15 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

## **PART 3 EXECUTION**

### **2.01 EXAMINATION**

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

### **2.02 PREPARATION**

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

### **2.03 INSTALLATION**

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

**2.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

**END OF SECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concealed blocking for miscellaneous items.
- B. Subflooring.
- C. Roof-mounted curbs.
- D. Roofing nailers.
- E. Preservative treated wood materials.
- F. Fire retardant treated wood materials.
- G. Concealed wood blocking, nailers, and supports.
- H. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-5.3.2 - Reduce Volatile Organic Compounds (VOC) Low-Emitting Materials•
  - 2. 2-6.1.2 - Biologically Based Products
  - 3. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. F. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- F. Section 055000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.
- G. Section 072500 - Weather Barriers: Air barrier over sheathing.
- H. Section 076200 - Sheet Metal Flashing and Trim: Sill flashings.
- I. Section 092116 - Gypsum Board Assemblies: Gypsum-based sheathing.

### **1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010 (Reapproved 2017).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood 2018.
- F. PS 1 - Structural Plywood 2009 (Revised 2019).
- G. PS 20 - American Softwood Lumber Standard 2020.
- H. SPIB (GR) - Grading Rules 2014.

### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having Biologically Based Products, documentation indicating percentages of Biologically-Based Products

### **1.05 DELIVERY, STORAGE, AND HANDLING**

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

### **1.06 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high Biobased content where possible
- B. Contractor shall endeavor to provide materials with the lowest possible VOC content.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. Species: Southern Pine, unless otherwise indicated.
  - 2. 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.
  - 3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://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 products shall have a minimum Biobased content of 25% as defined by the USDA.

**2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

**2.03 CONSTRUCTION PANELS**

- A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- B. Interior wall sheathing: Plywood, PSI Grade C-D, Exposure 1, 5/8" thick. Provide fire retardant treatment with flame spread index and smoke developed index as required by all applicable codes.

**2.04 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations,

unfinished steel elsewhere.

2. Provide Type 304 or 316 stainless-steel fasteners for exterior use and for both interior and exterior use where fastening into fire-retardant treated wood.

## **2.05 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Fire Retardant Treatment:
  1. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. 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 Treatment:
  1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber in contact with roofing, flashing, or waterproofing.
    - c. Treat lumber in contact with masonry or concrete.
    - d. Treat lumber less than 18 inches (450 mm) above grade.
  2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.

- a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
- b. Treat plywood in contact with roofing, flashing, or waterproofing.
- c. Treat plywood in contact with masonry or concrete.
- d. Treat plywood less than 18 inches (450 mm) above grade.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.
- B. Coordinate installation of rough carpentry members specified in other sections.
- C. Comply with all applicable codes for combustible material limitations.

#### **3.02 INSTALLATION - GENERAL**

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

#### **3.03 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Specifically, provide the following non-structural concealed framing and blocking for contractor and Government furnishings, including but not limited to the following:
  1. Cabinets and shelf supports.
  2. Wall brackets.
  3. Handrails.

4. Grab bars.
5. Towel and bath accessories.
6. Wall-mounted door stops.
7. Chalkboards and marker boards.
8. Wall paneling and trim.
9. Toilet Partitions.
10. Interior Wall Plaques
11. Lab Equipment
12. Mirror attachment clips.
13. Acoustical Wall Panels.
14. Audio/Visual Equipment
15. Communication Panels.
16. Fire extinguisher cabinets and brackets.
17. T.V. Brackets.
18. Security Equipment.

### **3.04 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

### **3.05 INSTALLATION OF CONSTRUCTION PANELS**

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
  1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.

3. Install adjacent boards without gaps.
4. Size and Location: As indicated on drawings.

### **3.06 TOLERANCES**

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

### **3.07 CLEANING**

- A. Waste Disposal: Comply with the requirements of Section 017419 - Construction Waste Management and Disposal.
  1. Comply with applicable regulations.
  2. Do not burn scrap on project site.
  3. Do not burn scraps that have been pressure treated.
  4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

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**SECTION 070100 - SPECIAL PROJECT ROOFING WARRANTY**

**PROJECT GENERAL CONTRACTOR'S ROOFING WARRANTY**

**NAME OF PROJECT:**

\_\_\_\_\_

**LOCATION:**

\_\_\_\_\_

**OWNER:**

\_\_\_\_\_

**GENERAL**

**CONTRACTOR:**

\_\_\_\_\_

**ADDRESS:**

\_\_\_\_\_

Date of Acceptance : \_\_\_\_\_ Date of  
Expiration: \_\_\_\_\_

- A. The Roofing, Metal Wall Panel, Metal Soffit Panel, Insulated Metal Wall Panel, Insulated Metal Roof Panel, & Aluminium-faced Composite Panel Contractor and General Contractor do hereby certify that the roofing, wall panel, and soffit panel and metal flashing work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved roofing manufacturers recommendations and provide warranties in accordance with Warranty Requirements per UFC 3-110-03 (Latest Edition) and as specified in individual specifications.
- B. The Roofing, Metal Wall Panel, Metal Soffit Panel, Insulated Metal Wall Panel, Insulated Metal Roof Panel, & Aluminium-faced Composite Panel Contractor and General Contractor do hereby guarantee the roofing, wall panels, soffit panels and associated work including but not limited to all flashing; roof decking and/or sheathing; all material used as a roof substrate or insulation over which roof is applied; metal work; flashing to be absolutely water tight and free from all leaks, due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of Beneficial Occupancy of the project. This guarantee does not extend to any deficiency which was caused by the failure of work which the general contractor or his assigns did not damage or did not accomplish or was not charged to accomplish.
- C. Subject to the terms and conditions listed below, the Roofing Contractor and General Contractor also guarantee that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the roofing manufacturers recommendations as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: Blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashing etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with construction

documents as are necessary to maintain said work in watertight conditions, and further, to respond on or within three (3) calendar days upon proper notification of leaks or defects by the Government.

1. Specifically excluded from this Guarantee are damages to the work, other parts of the building and building contents caused by: (1) lightning, windstorm with wind speeds above specified IBC code requirements, hailstorm and other unusual phenomena of the elements; and (2) fire. When the work has been damaged by any of the foregoing causes, the Guarantee shall be null and void until such damage has been repaired by the Roofing Contractor through the General Contractor, and until the cost and expense thereof has been paid by the Government or by the responsible party so designated.
2. During the Guarantee Period, if the Owner allows alteration of the work by anyone other the Roofing Contractor through the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations, only for that specific are of the roof. If the Government engages the Roofing Contractor through the General Contractor to perform said alterations, the Guarantee shall not become null and void, unless the Roofing Contractor through the General Contractor, prior to proceeding with said work, shall have notified the Government in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Guarantee.
3. Future building additions will not void this Guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the roof areas, and any damage caused by such addition. If this contract is for roofing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing roof.
4. During the Guarantee Period, if the original use of the roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
5. The Government shall promptly notify the Roofing Contractor through the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Roofing Contractor and General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

IN WITNESS THEREOF,

this instrument

has been duly executed this \_\_\_\_\_ day of the year \_\_\_\_\_.

\_\_\_\_\_

\_\_\_\_\_

Roofing Contractor's Authorized Signature    General Contractor's Authorized  
Signature

\_\_\_\_\_

\_\_\_\_\_

Typed Name and Title

Typed Name and Title

\_\_\_\_\_  
Notary Public

**PROVIDE SEPARATE WARRANTY FOR EACH SUBCONTRACTOR IF METAL  
ROOF PANEL, METAL WALL PANEL, AND METAL SOFFIT PANELS WORK IS  
BEING PERFORMED BY SEPARATE CONTRACTORS.**

**END OF SECTION**

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**SECTION 072100 - THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation at cavity wall construction and where indicated on the drawings.
  - 1. **Provide continuous board insulation on exterior side of metal stud wall sheathing and on concrete block at metal building of a minimum of R-7.6 and as indicated on drawings.**
- B. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-5.3.2 - Reduce Volatile Organic Compounds (VOC) Low-Emitting Materials
  - 2. 2-6.1.2 - Biologically Based Products
  - 3. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirement
- D. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- E. Section 01 7419 - Construction Waste Management and Disposal
- F. Section 04 2000 - Unit Masonry
- G. Section 054000 - Cold-Formed Metal Framing
- H. Section 061000 - Rough Carpentry: Supporting construction for batt insulation.

**1.03 REFERENCE STANDARDS**

- A. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2021.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- E. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C 2019a.
- F. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
- D. VOC Content Limitations: For the specified products, submit documentation of conformance with Specification Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- E. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content
    - b. Total weight of products provided.
  - 2. For products having Biologically Based Products, documentation indicating percentages of Biologically-Based Products.
  - 3. For products containing VOCs, documentation (material safety data sheets (MSDS), third-party certificates, or test reports) showing printed statement of VOC content.

#### **1.05 FIELD CONDITIONS**

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

**1.06 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
  - 1. Include statement indicating costs (sell price for each product having recycled content)b. Total weight of products provided
  - 2. Contractor shall endeavor to provide materials with a high Biobased content where possible.
  - 3. Contractor shall endeavor to provide materials with the lowest possible VOC content.

**PART 2 PRODUCTS**

**2.01 APPLICATIONS**

- A. Insulation Inside Exterior Masonry Cavity Walls Assemblies: Extruded polystyrene board.
- B. FOAM BOARD INSULATION MATERIALS
  - 1. Extruded Polystyrene Board Insulation: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, and the following characteristics:
    - a. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
    - b. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
    - c. R-value (RSI-value); 1 inch (25 mm) of material at 72 degrees F (22 C): 5 (0.88), minimum.
    - d. Board Size as required to coordinate with sepcified masonry anchor spacings.
    - e. Board Thickness as required to provide minimum R Value:
    - f. Board Edges: Square.
    - g. Minimum compressive strength: 25 PSI , ASTM D 1621
    - h. Minimum Biobased Content: 7%
    - i. Minimum Recycled Content: Total Recovered Materials - 9%

**PART 3 EXECUTION**

**3.01 EXAMINATION**

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

**3.02 BOARD INSTALLATION AT CAVITY WALLS**

- A. Apply adhesive to back of boards:
  - 1. Full bed 1/8 inch (3 mm) thick.
- B. Install boards to fit snugly between wall ties.
- C. Install boards horizontally on walls.
  - 1. Place boards to maximize adhesive contact.
  - 2. Butt edges and ends tightly to adjacent boards and to protrusions.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- E. Coordinate work of this section with construction of Weather barrier seal specified in Section 07 2500.
  - 1. Coordinate as required to ensure air barrier is installed continuously on top of sheathing prior to installation of masonry anchors. After installation of masonry anchors and z-clips-subgirt, re-install air barrier on top of anchors as required to seal penetrations in air barrier and metal z-panel clips - Girts. After installation of air barrier on masonry anchors, install rigid insulation as required in this specification section. Coordinate with section 07 2500.

**3.03 PROTECTION**

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

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including requirements of the Government's Solicitation and Division 1 Specification Sections, apply to this Section.

### **1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Materials and installation methods for fluid applied, vapor permeable air barrier membrane system located in the non-accessible part of the wall.
  - 2. Materials and installation methods to bridge and seal air leakage pathways in window and door openings, control and expansion joints, masonry ties, piping and other penetrations through the wall assembly.
- B. Related Sections include the following:
  - 1. Section 04 2000 – Unit Masonry
  - 2. Section 06 1000 – Rough Carpentry
  - 3. Section 07 6200 – Sheet Metal Flashing and Trim
  - 4. Section 07 9005 – Joint Sealers
- C. Provide single source manufacturers for Section 07 2500 Weather Barrier, Section 07 6500 Wall Flashing, Termination Bars (refer to 04 2000), and termination bar sealants (refer to 07 9005) as required to ensure compatibility among all products installed as a part of the moisture control assembly at the exterior walls.
  - 1. Where single source cannot be provided, notify the Government and provide written verification from manufacturers of all products intended for installation to ensure products from multiple manufacturers are compatible and all specified warranties can be provided and maintained in full force and effect for the entirety of the specified warranty periods for each product.

### **1.03 DEFINITIONS**

- A. 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.

**1.04 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. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:
    - a. It must be continuous, with all joints made airtight.
    - b. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water. (1.57 psf.) (equal to 0.02L/sq. m @ 75 Pa.).
    - c. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
    - d. It shall be durable or maintainable.
    - e. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
      - 1) Walls and windows or doors.
      - 2) Different wall cladding systems.
      - 3) Wall over unconditioned space.
      - 4) Walls across construction, control and expansion joints.
      - 5) Walls to utility, pipe and duct penetrations.
      - 6) All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

- f. Recoat over all penetrations after air barrier initial installation to include but not limited to fasteners for brick anchors and flashing termination bars.

### **1.05 REFERENCES**

- A. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.
- B. American Society for Testing and Materials (ASTM)
  - 1. C920 Specifications for Elastomeric Joint Sealants
  - 2. C1193 Guide for Use of Joint Sealants
  - 3. D412 Standard Test Methods for Rubber Properties in Tension
  - 4. D570 Test Method for Water Absorption of Plastics
  - 5. D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
  - 6. D1876 Test Method for Peel Resistance of Adhesives
  - 7. D1938 Test Method for Tear Propagation Resistance of Plastic Film and Sheeting
  - 8. D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
  - 9. D4258 Practice for Surface Cleaning Concrete for Coating
  - 10. D4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
  - 11. E96 Test Methods for Water Vapor Transmission of Materials
  - 12. E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
  - 13. E162 Test Method for Surface Flammability of Materials Using a Radiant Heat Source
  - 14. E1186 Practice for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems
  - 15. E2178-01 Standard Test Method for Air Permeance of Building Materials

### **1.06 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. Samples: Submit representative samples of the following for approval:
    - 1. Fluid applied membrane
    - 2. Transition tape
    - 3. Through Wall Flashing
  - D. 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.
  - E. Qualification Data: For firms and persons specified in “Quality Assurance” article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
  - F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers, submit certified test report showing compliance with requirements specified for ASTM E2178.
  - G. Warranty: Submit a sample warranty identifying the terms and conditions stated in this specification.

### **1.07 QUALITY ASSURANCE**

- A. Manufacturer: Air barrier systems shall be manufactured and marketed by a firm with a minimum of 5 years experience in the production and sales of waterproofing. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five years.
- B. 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.
- C. Mockups: Before beginning installation of air barrier, provide air barrier work for exterior wall assembly mockups, incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate

surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.

1. Coordinate construction of mockup to permit inspection by the Government of air barrier before external insulation and cladding is installed.
  2. If the Government determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
- D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Preinstallation conference shall include the Contractor, installer, Architect, Contracting Officer, Contracting Officer Representative(s) and system manufacturer's field representative. Agenda for meeting shall include but not be limited to the following:
1. Review of submittals.
  2. Review of surface preparation, minimum curing period and installation procedures.
  3. Review of special details and flashings.
  4. Sequence of construction, responsibilities and schedule for subsequent operations.
  5. Review of mock-up requirements.
  6. Review of inspection, testing, protection and repair procedures.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.
- B. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
- C. Protect fluid-applied membrane components from freezing and extreme heat.
- D. Sequence deliveries to avoid delays, but minimize on-site storage.

#### **1.09 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 wet substrate or during snow, rain, fog, or mist.

### **1.10 WARRANTY**

- A. **Material Warranty:** Manufacturer's standard form in which manufacturer agrees to replace fluid-applied air barrier membrane materials, that fail within specified warranty period when installed and used in strict conformance with written manufacturer's instructions.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to maintain air permeance rating not to exceed 0.02 L/s/sq. m. when tested per ASTM E2178, within specified warranty period.
    - b. Failure to maintain a vapor permeance rating greater than 10 perms when tested in accordance with ATM E96, Method B.
  - 2. **Warranty Period:** Five years from date of Beneficial Occupancy, signed by the authorized Waterproofing Subcontractor and the authorized General Contractor.

## **PART 2 - PRODUCTS**

### **2.01 FLUID-APPLIED, VAPOR PERMEABLE MEMBRANE AIR BARRIER**

- A. At all jambs, heads and sills of openings as well as other locations as shown on drawings, provide complete weather barrier system, including but not limited to air barrier and auxiliary materials herein listed and as required by manufacturer for the specified warranty. Provide written verification to the Government that the system to be provided will meet the Manufacturer's warranty requirement.
- B. Fluid applied to provide vapor permeable air and water barrier fully adhered membrane. Comply with NFPA 285.
- C. **Fluid-Applied, Vapor-Permeable Membrane Air Barrier with the following characteristics:**

Property	Typical Value	Test Method
Air permeance at a test pressure of 0.3 in. water (75 Pa) on CMU block	<0.0004 cfm/ft <sup>2</sup> (<0.002 L/s/m <sup>2</sup> )	ASTM E2178
Assembly air permeance at test pressure of 1.57 psf (75 Pa) <sup>1</sup>	<0.0008 cfm/ft <sup>2</sup> (<0.004 L/s/m <sup>2</sup> )	ASTM E2357
Water vapor transmission	11.2 perms	ASTM E96—method B
Peel adhesion to concrete block (CMU)	20 lbs/in.	ASTM D903
Peel adhesion of Perm-A-Barrier Wall Flashing	3 lbs/in.	ASTM D903
Peel adhesion to glass faced wall board <sup>2</sup>	5 lbs/in.	ASTM D903
Pull adhesion to glass faced wall board <sup>2</sup>	50 psi	ASTM D4541
Pull adhesion to concrete	200 psi	ASTM D4541
Tensile strength	300 psi	ASTM D412—die C
Elongation	300%	ASTM D412—die C
Color	Green	
Solids content	50% (approx.)	
Density	8.6 lbs/gal	
Drying time @ 50% R.H. 68°F—initial set <sup>3</sup>	4 hours	
Drying time @ 50% R.H. 68°F	24 hours	
UV exposure limit	6 months	ASTM D412, ASTM E96—method B
Nail sealability	Pass	ASTM D1970
Low temperature flexibility and crack bridging -15°F (at -26°C)	Pass	ASTM C836

**2.02 SYSTEM REQUIREMENTS**

**A. The products included in this specification section are tested and warranted as a system. The Contractor shall provide products, components, and accessories from a single manufacturer as required to provide specified system warranties. Refer also to paragraph 1.02(C) above. The system provided must:**

1. Meet published product performance criteria.
2. Provide documentation from the proposed manufacturers of independent third party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Provide documentation from the proposed manufacturers of independent third party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Provide documentation from the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.

**2.03 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. Liquid Membrane for Details and Terminations: Provide Bituthene Liquid Membrane or equal as recommended by air barrier manufacturer.

- C. Wall Primer (for Use with Throughwall Flashing and Tapes Applied to Substrate):  
Liquid waterborne primer recommended for substrate by manufacturer of air barrier material.
1. Flash Point: No flash to boiling point
  2. Solvent Type: Water
  3. VOC Content: Not to exceed 10 g/l
  4. Application Temperature: -4°C (25°F) and above
  5. Freezing point (as packaged): -7°C (21°F)
- D. **Flexible- Through Wall Membrane :** (40 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
1. Water Vapor Transmission: ASTM E96, Method B: 2.9 ng/m<sup>2</sup>sPa (0.05 perms) max.
  2. Water Absorption: ASTM D570: max. 0.1% by weight
  3. Puncture Resistance: ASTM E154: 356 N (80 lbs.) min.
  4. Tear Resistance
    - a. Initiation ASTM D1004: min. 58 N (13.0 lbs.) M.D.
    - b. Propagation ASTM D1938: min. 40 N (9.0 lbs.) M.D.
      - 1) Lap Adhesion at -4°C (25°F): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
      - 2) Low Temperature Flexibility ASTM D1970: Unaffected to -43°C (-45°F)
      - 3) Tensile Strength: ASTM D412, Die C Modified: min. 5.5 MPa (800 psi)
      - 4) Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: min. 200%.
      - 5) For additional requirements see Section 07 6500 Wall Flashing
- E. Joint Reinforcing Strip: Air barrier manufacturer's approved tape.
- F. **Transition Membrane equal to Hohmann Barnard X-Seal:** (40 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane.

Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following: Membrane shall be compatible with Weather Barrier, such that weather barrier will adhere to transition membrane.

1. Water Vapor Transmission: ASTM E96, Method B: 2.9 ng/m<sup>2</sup>sPa (0.05 perms) max.
  2. Water Absorption: ASTM D570: max. 0.1% by weight
  3. Puncture Resistance: ASTM E154: 356 N (80 lbs.) min.
  4. Tear Resistance
    - a. Initiation ASTM D1004: min. 58 N (13.0 lbs.) M.D.
    - b. Propagation ASTM D1938: min. 40 N (9.0 lbs.) M.D.
  5. Lap Adhesion at -4°C (25°F): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
  6. Low Temperature Flexibility ASTM D1970: Unaffected to -43°C (-45°F)
  7. Tensile Strength: ASTM D412, Die C Modified: min. 5.5 MPa (800 psi)
  8. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: min. 200%.
- G. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
1. Product: Bituthene Liquid Membrane or equal as recommended by air barrier manufacturer.
- H. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft (24 to 32 kg/cu. m) density; flame spread index of 25 or less according to ASTM E162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- I. Joint Sealant: ASTM C920, 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.

## **PART 3 - EXECUTION**

### **3.01 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. Verify that concrete has cured and aged for minimum time period recommended by air barrier manufacturer.
3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
4. Verify that masonry joints are struck flush and completely filled with mortar.
5. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 SURFACE PREPARATION**

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied air barrier system.
- B. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.
- C. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- D. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or membrane equal to Bituthene Liquid Membrane at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

### **3.03 AIR BARRIER MEMBRANE INSTALLATION**

- A. Apply air barrier membrane 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 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: 90-mil (2.4-mm) wet film thickness, 45-mil (1.2-mm) dry film thickness.
- D. Do not cover air barrier until it has been tested and inspected by the Government's testing agency.
- E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

### **3.04 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.
  1. Install all flashings only after application of air barrier.
- B. Apply primer to substrates to receive transition tapes at required rate and allow to dry. Limit priming to areas that will be covered by transition tape in same day. Reprime areas exposed for more than 24 hours.
  1. Prime glass-fiber-surfaced gypsum sheathing not covered with air membrane material with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air barrier membrane continuously to floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- E. 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.
- F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames with not less than 1 inch (25 mm) of full contact.
  1. Transition Strip: Roll firmly to enhance adhesion.
- G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- H. 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 (150 mm) beyond repaired areas in strip direction.

### **3.05 FIELD QUALITY CONTROL**

- A. Testing Agency: The contractor shall 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 throughout the building envelope with no gaps or holes.
  - 2. Continuous structural support of air barrier system has been provided.
  - 3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings.
  - 4. Site conditions for application temperature and dryness of substrates have been maintained.
  - 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
  - 6. Surfaces have been primed, if applicable.
  - 7. 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.
  - 8. Termination mastic has been applied on cut edges.
  - 9. Strips and transition strips have been firmly adhered to substrate.
  - 10. Compatible materials have been used.
  - 11. Transitions at changes in direction and structural support at gaps have been provided.
  - 12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
  - 13. All penetrations have been sealed.
- C. Tests: Testing to be performed will be determined by the Contractor's testing agency from among the following tests:
  - 1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, smoke pencil with pressurization or depressurization.

- D. Remove and replace deficient air barrier components and retest as specified above.

### **3.06 CLEANING AND PROTECTION**

- A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. 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 150 days.
- C. 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.
- D. Remove masking materials after installation.

### **3.07 WARRANTY**

- A. The Waterproofing Contractor and General Contractor shall provide a five (5) year warranty subject to the terms and conditions as rendered in the Project Waterproofing Warranty included at the end of this section.

**PROJECT WATERPROOFING WARRANTY**

**NAME OF PROJECT:**

\_\_\_\_\_

**LOCATION:**

\_\_\_\_\_

**OWNER:**

\_\_\_\_\_

**WATERPROOFING**

**CONTRACTOR:**

\_\_\_\_\_

**ADDRESS:**

\_\_\_\_\_

**DATE OF ACCEPTANCE** \_\_\_\_\_  
**EXPIRATION** \_\_\_\_\_

**DATE OF**

- B. The Waterproofing Contractor and General Contractor do hereby certify that the vapor permeable, fluid-applied membrane work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved waterproofing manufacturers' recommendations.
- C. The Waterproofing Contractor and General Contractor do hereby guarantee the waterproofing and associated work including but not limited to all vapor permeable, fluid-applied membrane air barrier vertical and horizontal waterproofing to be water tight and free from all leaks, due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of Beneficial Occupancy of the project.
- D. Subject to the terms and conditions listed below, the Waterproofing Contractor and General Contractor also guarantee that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the vapor permeable, fluid-applied membrane air barrier manufacturers recommendations as are necessary to correct faulty and defective work and/or materials which may develop in the work including.  
Anticipated life of the waterproofing systems and the best standards applicable to the particular waterproofing type in value and in accordance with construction documents as are necessary to maintain said work in watertight conditions, and further, to respond on or within seven (7) calendar days upon proper notification of leaks or defects by the Government.
  - 1. During the Guarantee Period, if the Government allows alteration of the work by anyone other the Waterproofing Contractor or the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything affected by, this Guarantee shall become null and void upon the date of said alterations
  - 2. Future building additions will not void this Guarantee, except for that portion of the future addition that might affect the work under this contract at the point

of connection of the waterproofed areas, and any damage caused by such addition.

- 3. The Government shall promptly notify the Waterproofing Contractor or General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Waterproofing Contractor or General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

**IN WITNESS THEREOF, this instrument has been duly executed**

this \_\_\_\_\_ day of \_\_\_\_\_ (year).

_____	_____	_____
Waterproofing Contractor's Signature	General Contractor's Authorized Signature	Authorized

_____	_____
Typed Name and Title	Typed Name and Title

\_\_\_\_\_  
Notary Public

**END OF SECTION 07272**

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**SECTION 074114 - INSULATED METAL ROOF PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural roofing system: foam core standing seam two skin steel roof panels with related trim and accessories
- B. Metal Building Systems roof applications
- C. Thermal roof insulation.
- D. Fastening system.
- E. Accessories and miscellaneous components.
- F. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 07 7214 - Insulated Metal Wall Panels
- F. Section 07 7123 - Manufactured Gutters & Downspouts
- G. Section 079200 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction.
- H. Section 13 3419 - Metal Building Systems
- I. Section 01 3329 - Sustainable Design Reporting
- J. Section 01 3566 - Project Sustainability Summary

**1.03 REFERENCE STANDARDS**

- A. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy- Coated (Galvannealed) by the Hot-Dip Process.

- B. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
- C. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- D. Metl-Span CFR Roof INSULATED METAL ROOF PANELS Copyright ©2016 Metl-Span, a division of NCI Group, Inc. All rights reserved. SECTION 07 41 13 - Page 3 of 13
- E. ASTM A 924 - General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- F. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
- G. . ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
- H. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.
- I. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics
- J. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- K. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- L. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
- M. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
- N. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
- O. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- P. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
- Q. ASTM E 1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
- R. ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

- ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2021a.
- S. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
  - T. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
  - U. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings 2020a.
  - V. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference 2005 (Reapproved 2017).
  - W. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference 2011 (Reapproved 2018).
  - X. ASTM E1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems 2016.
  - Y. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems 2018.
  - Z. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Storage and handling requirements and recommendations.
  - 2. Installation methods.
  - 3. Specimen warranties as specified.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
  - 1. Show work to be field-fabricated or field-assembled.
  - 2. Include structural analysis signed and sealed by qualified structural engineer, indicating conformance of roofing system to specified loading conditions.
- D. Sustainability Submittals:
  - 1. Product data indicating the following:

- a. Material costs for each product having recycled content.
  - b. Percentages by weight of post-consumer and pre-consumer recycled content for each item.
  - c. Total weight of products provided.
- E. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches (305 mm) square, representing actual roofing metal, thickness, profile, color, and texture.
- G. Manufacturer Qualification Statement: Provide documentation showing metal roof panel fabricator is accredited under IAS AC472.
- H. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Government's name and are registered with manufacturer.
1. Sustainability Submittals, Product data for HPSB Compliance:
    - a. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
      - 1) Include statement indicating costs (sell price for each product having recycled content)Total weight of products provided

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in the manufacture of roofing systems similar to those required for this project.
1. Not less than 3years of documented experience.
- B. Installer Qualifications: Company trained and authorized by roofing system manufacturer.
- C. Preinstallation Conference:
1. Approximately two weeks prior to scheduled commencement of roofing installation and associated work, meet at project site with Installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of roof-top units and other work in and around roofing which must precede or follow roofing work (including mechanical work, if any), Architect, Contracting Officer, Contracting Officer Representative(s), roofing system manufacturer's technical representative, and other representatives directly concerned with the performance of the work, including (where applicable) the Government's insurer's, test agencies,

governing authorities, and roofing consultant.

2. All roofing submittals shall have been submitted and reviewed by the Government prior to the pre-roofing conference.
- D. Roofing Consultant Services:
1. The Government will engage the services of a Professional Roof Consultant. The Consultant must be listed as a Professional Member of the Roof Consultants Institute (RCI, Inc.). The Consultant shall attend the pre-roofing/wall meeting and perform no less than three (3) inspections during the installation of the new metal wall panel system(s) (1-start up inspection, 2 –Interim inspection, 3 – Final inspection). The consultant must document all site visits with photographs and written reports. All reports shall be forwarded to the Government with documentation of the job progress and any deficiencies noted during the inspections. The Contractor will be required to make any and all repairs to deficiencies noted by the roofing consultant at no additional cost to the Government. Upon completion of all punch list items, the Roof Consultant shall provide a letter of certification to the Government stating the new wall/roof system has been installed per the requirements of the contract documents, manufacturer’s requirements, and all warranty requirements.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

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

#### **1.07 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Finish Warranty: Provide manufacturer’s special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 20 year period from date of Beneficial Occupancy.
- C. Waterproofing Warranty: Provide manufacturer’s warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of 10 years from date of Beneficial Occupancy.
- D. Standard Manufacturer's roofing guarantees which contain language regarding the governing of the guarantee by any state other than the State of Alabama, must be amended to exclude such language, and substituting the requirement that the Laws of the State of Alabama shall govern such guarantees.
- E. When conflicts occur between these specifications and the manufacturer's warranty requirements, the Government shall be notified immediately in writing prior to bid

explaining the difference and requesting approval for change from the specifications in order to comply with the manufacturer's warranty requirements.

## **PART 2 PRODUCTS**

### **2.01 STRUCTURAL METAL ROOF PANELS**

- A. Structural Metal Roofing: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for conformance to the following minimum standards:
1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed 1/180 of the span when tested in accordance with ASTM E1592.
    - a. Dead Loads: Weight of roofing system.
    - b. Live Loads: As indicated on drawings
  2. Wind Uplift: Class 90 wind uplift resistance of UL 580.
  3. Air Infiltration: Maximum 0.06 cfm/sq ft (1.1 cubic meters/hr/sq m) at air pressure differential of 6.24 lbf/sq ft (300 Pa), when tested according to ASTM E1680.
  4. Water Penetration: No water penetration when tested according to procedures and recommended test pressures of ASTM E1646. Perform test immediately following air infiltration test.
  5. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F (56 degrees C).
  6. Thermal Performance:
    - a. System minimum R value 16.67, 2 inch thick panel or approved Roof Panel
    - b. Minimum SRI Value of 48
    - c. Minimum Thermal Emittance of 0.87
- B. Metal Panels: Factory-formed panels with factory-applied finish.
1. Type: Double skin, factory-assembled with foamed-in-place urethane insulation.
  2. Steel Panels:
    - a. Aluminum-zinc alloy-coated SS (structural steel) sheet conforming to ASTM A792/A792M; minimum AZ50 (AZM150) coating.

- b. Custom Fluoropolymer Coat System: Provide on exterior finish Polyvinylidene fluoride (PVDF) multi - Coat Thermoplastic fluoropolymer coating system, including 70% PVDF color topcoat and minimum dry film thickness of .9 mil. Color and gloss as selected by the Government.
  - c. Silicone polyester: Provide on interior finish. Color as selected by the Government.
  - d. Steel Thickness: Exterior Panel skin shall be a Minimum 22 gage (0.03 inch) (0.76 mm).
  - e. Steel Thickness : Interior Panels skin shall be a minimum 24 gage
3. Profile: Standing seam, with minimum 2.0 inch (51 mm) seam height; concealed fastener system for field seaming with special tool.
  4. Profile: Lapped seam, with integral sealant bead and exposed fastener system.
  5. Texture: Smooth.
  6. Length: Full length of roof slope, without lapped horizontal joints.
  7. Width: Maximum panel coverage of 42 inches (1067 mm). Provide custom widths as required for job conditions.
  8. Recycled Content: For Steel Products: Minimum Total Recivered Contenet - 30%

## **2.02 SECONDARY FRAMING**

- A. Miscellaneous Secondary Framing: Light gage steel framing incidental to structural supports; fabricated from steel sheet.
  1. Thickness: 12 gage, 0.1046 inch (2.657 mm).
  2. Finish: Galvanized per ASTM A653/A653M, G90.
- B. Framing Connectors: Factory-made formed steel sheet, ASTM A653/A653M SS Grade 50, with G60/Z180 hot dipped galvanized coating and factory punched holes.

## **2.03 ACCESSORIES AND MISCELLANEOUS ITEMS**

- A. Miscellaneous Sheet Metal Items: Provide flashings, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.

**C. Sealants:**

1. Refer to Section 07 9005 Joint Sealants. Provide Sealants as required by manufacturer for full specified warranties.
  2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
- D. Foam Thermal Insulation:** Provide non-chlorofluorocarbon (non CFC) polyurethane foam
- E. Manufacturer's standard pre-molded pipe flashing with stainless steel clamping ring and field fabricated metal hood.**

**2.04 FABRICATION**

- A. Panels:** Fabricate panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A.** Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
- B.** If substrate preparation is the responsibility of another installer, notify The Government of unsatisfactory preparation before proceeding.
- C.** Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- D.** Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
- E.** Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.
- F. Overall:** Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
  2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is

absolutely prohibited. Field cutting on actual roof itself is not allowed.

- G. Accessories: Install all components required for a complete roofing assembly, including flashings, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- H. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
  - 1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by the panel manufacturer.

### **3.02 CLEANING**

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

### **3.03 PROTECTION**

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

**END OF SECTION**

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**SECTION 074214 - INSULATED METAL WALL PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Factory-assembled foamed core two skin metal panel system for walls, with trim, related flashings and accessory components to be installed at all pre-engineered metal building system roof applications.
- B. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions
- E. Section 01 7419 - Construction Waste Management and Disposal
- F. Section 01 3329 - Sustainable Design Reporting
- G. Section 01 3566 - Project Sustainability Summary
- H. Section 054000 - Cold-Formed Metal Framing: Stud wall framing system.
- I. Section 07 4114 - Insulated Roof Panels
- J. Section 074113 - Metal Roof Panels.
- K. Section 076200 - Sheet Metal Flashing and Trim.
- L. Section 079200 - Joint Sealants: Sealing joints between metal wall panel system and adjacent construction.
- M. Section 08 4313 - Aluminum-Framed Storefronts
- N. Section 133419 - Metal Building Systems: Building framing system.
- O. Section 07 4114 - Insulated Metal Roof Panels
- P. Section 07 4293 - Metal Soffit Panels

Q. Section 07 4213 - Ribbed Metal Panels

### **1.03 REFERENCE STANDARDS**

- A. American Architectural Manufacturer's Association (AAMA): [www.aamanet.org](http://www.aamanet.org):
1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
- B. American Society of Civil Engineers (ASCE): [www.asce.org/codes-standards](http://www.asce.org/codes-standards):
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM): [www.astm.org](http://www.astm.org):
1. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  2. ASTM C 518 - Standard Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  3. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
  4. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
  5. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.
  6. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
  7. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
  8. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics
  9. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
  10. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
  11. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  12. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

13. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- D. National Fire Protection Association (NFPA)
  1. NFPA 259 - Test Method for Potential Heat of Building Materials.
  2. NFPA 285 - Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies.

#### **1.04 ADDITIONAL REFERENCES**

- A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2021a.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- D. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.
- E. FM 4880 - Approval Standard for Class 1 Fire Rating of Building Panels or Interior Finish Materials 2015.

#### **1.05 PRE-INSTALLATION MEETING**

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

#### **1.06 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures
- B. Product Data: Provide manufacturer documentation on tested structural, thermal, and fire resistance capabilities of assembled panel.
- C. Shop Drawings: Indicate dimensions.
- D. Samples: Submit two samples of panel, 12"x12" inch (305x305 mm) in size illustrating finish color, sheen, and texture.
- E. Design and Performance Data: Indicate panel profile and dimensions.
- F. Manufacturer's Installation Instructions: Indicate special handling criteria.
- G. Verification Samples: 12 inch x 12 inch , same requirements as samples.
- H. Sustainability Submittals, Product data for HPSB Compliance:

1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
2. Include statement indicating costs (sell price for each product having recycled content)
  - a. Total weight of products provided

### **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 3 years experience.

### **1.08 MOCK-UP**

- A. Construct mock-up, 8 feet (2.4 m) long by 8 feet (2.4 m) wide, including panels.
- B. Demonstrate component assembly including panel and glazing materials, weep drainage system, attachments, anchors, and perimeter sealant.
- C. Mock-up may remain as part of the Work.

### **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store pre-finished material off ground with weather protection to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials that could cause discoloration or staining.

### **1.10 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
  1. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal wall panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 20 year period from date of Beneficial Occupancy.
  2. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace wall panels that fails to keep out water within specified warranty period of 10 years from date of Beneficial Occupancy.

### **1.11 PANEL SYSTEM**

- A. Metal Panel System: Factory-assembled metal panel system, with trim, related flashings and accessory components.
  - 1. Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
  - 2. Accommodate tolerances of building structural framing.
- B. Performance Requirements:
  - 1. Thermal Performance:
    - a. Minimum Continuous R-value of in accordance with ASHRAE 90.1-2013
    - b. Maximum Allowable Deflection of Panel: 1/90 of span.
  - 2. Fire Resistance: Class 1 fire rated, without height limitation, when tested in accordance with FM 4880.
  - 3. Wind Resistance: Class 1 Approval for wall and roof construction, without height limitation, in accordance with FM 4881.
    - a. Normal movement between system components.
    - b. Seasonal temperature cycling.
    - c. Deflection of structural support framing,
  - 4. Recycled Content: For Steel Products: Minimum Total Recovered Materials Content - 30%.

### **1.12 PANELS AND TRIM**

- A. Wall Panels: Exterior and interior metal sheet skin, factory-assembled, with foamed in place insulation; exterior and interior sheet interlocking at edges, fitted with continuous gaskets.
  - 1. Panel Width: 42 inch (1067 mm). Provide custom widths as required for job conditions.
  - 2. Profile: Refer to Contract Documents for location. TYPE A - Striated, TYPE B - Light Mesa ; vertical panels.
  - 3. Panel Thickness: 2 inch (51 mm). Minimum R-Value shall equal 13 or with an approved in writing by the Government, panel with a minimum R - value of 9.8 C.I. per Ashrae 90.1 2013.
  - 4. Aluminum-zinc alloy-coated SS (structural steel) sheet conforming to ASTM A792/A792M; minimum AZ50 (AZM150) coating.

5. Custom Fluoropolymer Coat System: On exterior finish provide Polyvinylidene fluoride (PVDF) multi - Coat Thermoplastic fluoropolymer coating system, including 70% PVDF color topcoat and minimum dry film thickness of .9 mil. Color and gloss as selected by the Government.
  6. Type: Double skin, factory-assembled with foamed-in-place urethane insulation.
  7. Exterior Sheet: Pre-finished aluminum-zinc alloy-coated steel, 22 gage, 0.0299 inch (0.76 mm) minimum base metal thickness; smooth.
  8. Interior Sheet: Aluminum-zinc alloy-coated steel, pre-finished, [26 ] gage, [26 ] inch ([ ] mm) minimum base metal thickness.
  9. Exterior Finish: Polyvinylidene fluoride (PVDF) coating; as selected by Government color.
  10. Interior Finish: Silicone polyester coating; color as selected.
- B. Internal and External Corners: Same material, thickness, and finish as exterior sheets; factory-fabricated mitered to required angles in one continuous piece with minimum 18 inch (450 mm) returns.
- C. Trim, Closure Pieces, Expansion Joints, Caps, Flashings, Fascias, and Infills: Same material , thickness and finish as exterior sheets; factory-fabricated to required profiles; fabricated in longest practicable lengths.
1. Exposed Fasteners: Not permitted.
  2. Profiles: To suit system.

### **1.13 PANEL MATERIALS**

- A. Precoated Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, Commercial Steel (CS) or Forming Steel (FS), with AZ50/AZM150 coating; continuous coil coated with acrylic primer coat, polyvinylidene fluoride (PVDF) top coat, and polyester washcoat for panel back.
1. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- B. Gaskets: Manufacturer's standard type suitable for use with panel system, permanently resilient; ultraviolet and ozone resistant; color as selected.
- C. Panel Sealants: Manufacturer's standard type suitable for use with installation of panel system; non-staining,skinning, non-shrinking, non-sagging, ultra-violet and ozone resistant; color as selected.

### **1.14 ACCESSORIES**

- A. Subgirts: As required for system design.

- B. Fasteners: Manufacturer's standard type to suit application; hot-dip galvanized steel with soft neoprene washers. Fastener cap same color as exterior panel.
- C. Field Touch-up Paint: As recommended by panel manufacturer.

### **PART 3 EXECUTION**

#### **2.01 EXAMINATION**

- A. Verify that structural framing and applicable sub-girts are ready to receive panel system.

#### **2.02 INSTALLATION**

- A. Install panel system on walls and soffits in accordance with manufacturer's instructions.
- B. Permanently fasten panel system to structural supports; aligned, level, and plumb, within specified tolerances.
- C. Locate panel joints over supports.
- D. Use concealed fasteners unless otherwise approved by The Government.
- E. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

#### **2.03 TOLERANCES**

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch (1.6 mm).

#### **2.04 CLEANING**

- A. Remove site cuttings from finish surfaces.
- B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.
- C. Upon completion of installation, thoroughly clean prefinished aluminum surfaces in accordance with AAMA 609 & 610.

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**SECTION 074293 - METAL SOFFIT PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flush-profile, concealed fastener, lap-seam metal soffit panels, with related metal trim and accessories.
- B. Liner Panels on wall, with related metal trim and accessories, separating base supply from the DSP addition as indicated in the Contract Documents.
- C. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS:**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Division 05 Section "Structural Steel Framing" for steel framing supporting metal panels.
- F. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal panels.
- G. Division 07 Section "Metal Roof Panels" for metal roof panels installed with metal soffit and liner panel
- H. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing items in addition to items specified in this Section.
- I. Division 13 Section "Metal Building Systems" for steel framing supporting metal panels.

**1.03 REFERENCES**

- A. American Architectural Manufacturer's Association (AAMA):
  - 1. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-

Aluminum Coated Steel Substrates.

2. AAMA 809.2 Voluntary Specification Non-Drying Sealants.
- B. American Society of Civil Engineers (ASCE): [www.asce.org/codes-standards](http://www.asce.org/codes-standards) <<http://www.asce.org/codes-standards>>:
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM): [www.astm.org](http://www.astm.org) <<http://www.astm.org>>:
1. ASTM A755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  3. ASTM C920 - Specification for Elastomeric Joint Sealants.
  4. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
  5. ASTM D4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
  6. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- D. International Accreditation Service (IAS):
1. IAS AC472 Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems,

#### **1.04 QUALITY ASSURANCE**

- A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer accredited under IAS AC472, Part B.
- B. Installer Qualifications: Experienced Installer [certified by metal panel manufacturer] with minimum of 15 years experience with successfully completed projects of a similar nature and scope.
1. Installer's Field Supervisor: Experienced mechanic [certified by metal panel manufacturer] supervising work on site whenever work is underway.
- C. Steel Construction Publications: Comply with published recommendations in the following:
1. American Institute of Steel Construction (AISC): "Steel Construction Manual."

2. American Iron and Steel Institute (AISI): "Cold Formed Steel Design Manual."

### **1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by the Government, Architect, metal panel installer, metal panel manufacturer's technical representative, inspection agency and related trade contractors.
  1. Coordinate building framing in relation to metal panel system.
  2. Coordinate openings and penetrations of metal panel system.
  3. Coordinate work of Division 07 Sections "Roof Specialties" and "Roof Accessories" and openings and penetrations and manufacturer's accessories with installation of metal panels.

### **1.06 ACTION SUBMITTALS**

- A. Product Data: Manufacturer's data sheets for specified products. Include data indicating compliance with performance requirements.
- B. Sustainability Submittals:
  1. Product data indicating the following:
    - a. Material costs for each product having recycled content.
    - b. Percentages by weight of post-consumer and pre-consumer recycled content for each item.
    - c. Total weight of products provided.
- C. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.
  1. Indicate points of supporting structure that must coordinate with metal panel system installation.
  2. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.
- D. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
- E. Samples for Verification: Provide 12-inch- (305 mm-) long section of each metal panel profile. Provide color chip verifying color selection.

### **1.07 INFORMATIONAL SUBMITTALS**

- A. Product Test Reports: Indicating compliance of products with requirements.
- B. Qualification Information: For Installer firm and Installer's field supervisor.
- C. IAS Accreditation Certificate: Indicating that manufacturer is accredited under provisions of IAS AC472 Part B.
- D. Buy American Certification: Manufacturers' letters of compliance acceptable to authorities having jurisdiction, indicating that products comply with requirements.
- E. Manufacturer's warranty: Unexecuted sample copy of manufacturer's warranty.
- F. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
  - 2. Include statement indicating costs (sell price for each product having recycled content)
  - 3. Total weight of products provided.

### **1.08 CLOSEOUT SUBMITTALS**

- A. Maintenance data.
- B. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

### **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.
  - 1. Deliver, unload, store, and erect metal panels and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
  - 2. Store in accordance with Manufacturer's written instruction. Provide wood collars for stacking and handling in the field.

### **1.10 WARRANTY**

- A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail in materials and workmanship within 15 years from date of Beneficial Occupancy.
- B. Special Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within the warranty period, as follows:

1. Fluoropolymer Two-Coat System:
2. Color fading in excess of 5 Hunter units per ASTM D2244.
3. Chalking in excess of No. 8 rating per ASTM D4214.
4. Failure of adhesion, peeling, checking, or cracking.
5. Warranty Period: 25 years from date of Beneficial Occupancy.

## **PART 2 PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. Recycled Content: For Steel Products: Minimum total Recovered content - 30%
- C. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E1592:
  1. pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
  2. Wind Negative Pressure: Certify capacity of metal panels by actual testing of proposed assembly.
    - a. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/120 of the span with no evidence of failure.
    - b. Seismic Performance: Comply with ASCE 7 Sections 9, "Earthquake Loads."
- D. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

### **2.02 FORMED METAL SOFFIT PANELS**

- A. Flush-Profile, Concealed Fastener Metal Soffit Panels: Metal panels consisting of formed metal sheet with vertical panel edges, with flush joints between panels, field assembled with nested lapped edges, and attached to supports using concealed fasteners.

1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A755/A755M.
2. Nominal Thickness: 24 gage coated thickness, with smooth surface.
  - a. Exterior Finish: Fluoropolymer two-coat system
  - b. Color: Match the Government's custom color.
    - 1) Panel Width: 12 inches (305 mm).
    - 2) Panel Thickness: 1 inch (25 mm).

## **2.03 MISCELLANEOUS MATERIALS**

- A. General: Provide complete metal panel assemblies incorporating trim, fasciae, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
- B. Flashing and Trim: Match material, thickness, and finish of metal panels.
- C. Fasteners: Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.

## **2.04 FABRICATION**

- A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

## **2.05 FINISHES**

- A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 2605 , meeting solar reflectance index requirements. Match existing color of metal panels.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.

1. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer.  
Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.
- B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

### **3.02 METAL PANEL INSTALLATION**

- A. Concealed-Fastener Formed Metal Soffit Panels: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, project drawings, and referenced publications. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.
- B. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer. Fasten panel to support structure through leading panel flange. Fit back flange of subsequent panel into secured flange of previous panel.
  1. Cut panels in field where required using manufacturer's recommended methods.
  2. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer.
- C. Attach panel flashing trim pieces to supports using recommended fasteners.

### **3.03 ACCESSORY INSTALLATION**

- A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
  1. Install components required for a complete metal panel assembly, including trim, flashings, sealants, closure strips, and similar items.
  2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
  3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

### **3.04 CLEANING AND PROTECTION**

- A. Clean finished surfaces as recommended by metal panel manufacturer.

- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Government.

### **3.05 FIELD QUALITY CONTROL**

- A. The Government will engage the services of a Professional Roof Consultant. The Consultant must be listed as a Professional Member of the Roof Consultants Institute (RCI, Inc.). The Consultant shall attend the pre-roofing/wall meeting and perform no less than three (3) inspections during the installation of the new metal wall panel system(s) (1-start up inspection, 2 –Interim inspection, 3 – Final inspection). The consultant must document all site visits with photographs and written reports. All reports shall be forwarded to the Government with documentation of the job progress and any deficiencies noted during the inspections. The Contractor will be required to make any and all repairs to deficiencies noted by the roofing consultant at no additional cost to the Government. Upon completion of all punch list items, the Roof Consultant shall provide a letter of certification to the Government stating the new wall/roof system has been installed per the requirements of the contract documents, manufacturer's requirements, and all warranty requirements.

**END OF SECTION**

**SECTION 076200 - SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other applications indicated on the drawings or as required.
- B. Sealants for joints within sheet metal fabrications.
- C. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3001 - Submittals
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 3566 - Project Sustainability Summary
- D. Section 01 6000 - Product Requirements
- E. section 01 7419 - Construction Waste Management and Disposal
- F. Section 05 5000 - Metal Fabrications.
- G. Section 061000 - Rough Carpentry: Wood nailers for sheet metal work.
- H. Section 07 7123 - Manufactured Gutters and Downspouts
- I. Section 07 4113 - Metal Roof Panels
- J. Section 07 4293 - Metal Soffit Panels
- K. Section 077100 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.
- L. Section 07 7123 - Manufactured Gutters and Downspouts.
- M. Section 07 9000 - Joint Sealers.
- N. Section 08 4313 - Aluminum-framed Storefronts
- O. Section 08 800 - Glazing

**1.03 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- D. CDA A4050 - Copper in Architecture - Handbook current edition.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

**1.04 ADMINISTRATIVE REQUIREMENTS**

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

**1.05 SUBMITTALS**

- A. Sustainability Submittals:
  - 1. Product data indicating the following:
    - a. Material costs for each product having recycled content.
    - b. Percentages by weight of post-consumer and pre-consumer recycled content for each item.
    - c. Total weight of products provided.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two physical samples illustrating metal finish color.
- D. Submit details and mock ups certified by manufacturer of outside corner of wall flashing conditions.
- E. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Total weight of products provided

**1.06 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.
- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.
- D. Provide written verification that low slope roof flashing meets or exceeds ES-1. Increase thickness of flashings as required to obtain ES-1.

**1.07 MOCK UP**

- A. Refer to 01 4000 - Provide installed roof sample on mock-up.

**1.08 DELIVERY, STORAGE, AND HANDLING**

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

**1.09 PRE-ROOFING MEETING:**

- A. Organize and conduct a meeting at the construction site 2 weeks before scheduled start of roof system installation with roofing installer; installer of each component of related work, including deck or substrate construction, roof equipment, penetrations of roof deck, and other work integral with or adjacent to roofing; the architect; the Contracting Officer; the Contracting Officer Representative(s), roofing manufacturer's representative; the Government's roofing consultant; roofing contractor; and other parties involved with roofing system performance, independent testing agencies, and governing authorities.
  - 1. Walk roof areas to review and discuss substrate preparation including repair of unacceptable surfaces, roof drainage, penetrations, equipment curbs, and work performed by other trades which requires coordination with roofing system.
  - 2. Examine steel deck for proper flatness and slope, review structural capability for supporting roofing system and methods of fastening.
  - 3. Review contract document requirements and submittals for roofing system, including roofing schedule, inspection and testing, and environmental conditions. Identify what are considered unacceptable weather conditions for roofing, and which governing regulations or insurance requirements will affect roofing system installation.
  - 4. Document discussions in writing, including actions required, and distribute copy of reports to each meeting participant.

**1.10 WARRANTIES:**

- A. Flashing warranty: Provide flashing warranty, agreeing to correct defects of materials.
  - 1. Duration: Five (20) years from the date of completion.
- B. Manufacturer's finish warranty:
  - 1. Covering bare metal against rupture, structural failure and perforation due to normal atmospheric corrosion exposure.
  - 2. Covering panel finish against cracking, checking, blistering, peeling, flaking, chipping, chalking and fading.
  - 3. Duration: twenty (20) years
  - 4.

**PART 2 PRODUCTS**

**2.01 SHEET MATERIALS**

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage thick base metal, shop pre-coated with PVDF coating.
  - 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system. Provide manufacturer's standard prime coat on underside.
  - 2. Color: Prior to ordering sheet metal, contractor to receive in color selection approval in writing by The Government from manufacturer's full colors.
- B. Recycled Content: For Steel Products: Minimum Total Recovered Materials Content - 30%
- C. Pre-Finished Aluminium: ASTM B209 (ASTMB209M); .050 inch (1.30 mm) thick plain finish shop pre-coated with modified silicone coating
  - 1. Surface: Smooth, Flat
  - 2. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
    - a. Color: As selected by the Government from manufacturer's full colors or match color of adjacent metal roof or wall panel. Also provide custom coloring. Provide allowance for two different colors.
  - 3. Concealed Finish: Pretreated with manufacturer's white or light colored acrylic-polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm)

- D. Provide Pre-Finished Galvanized Steel when in contact with Steel products.  
Provide Pre-Finished Aluminum when in contact with Aluminum products.
- E. Bond Membrane: do not allow dissimilar metals to contact. Provide a manufacturer approved bond membrane between dissimilar metals.

## **2.02 ACCESSORIES**

- A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
- B. Underlayment:
  - 1. Refer to specification section 07 4113 - Metal Roof Panels.
- C. Primer: As recommended by manufacturer for application and specified finish.
- D. Protective Backing Paint: Asphaltic mastic, ASTM D 4479 Type I.
- E. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
- F. Sealant to be Exposed in Completed Work: {rs#1}; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- G. Sealant: Type II specified in Section 07 9005 - Joint Sealants.
- H. Plastic Cement: {rs#1}, Type I.

## **2.03 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, minimum 2 inches (50 mm) wide, interlocking with sheet. Provide continuous cleats where indicated on drawings and/or recommended by SMACNA.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel.  
Return and brake edges.

- I. Gutters: SMACNA (ASMM) Rectangular profile.
- J. Downspouts: Rectangular profile.
- K. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- L. Accessories: Profiled to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA requirements.
  - 2. Gutter Supports: Brackets.
  - 3. Downspout Supports: Brackets.
- M. Seal metal joints.
- N. Coordinate downspout size with Downspout Boots as required

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).
- C. Protect against galvanic action between dissimilar metal contact surfaces as recommended by metal manufacturers.

#### **3.03 INSTALLATION**

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- C. Seal metal joints watertight.

#### **3.04 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for field inspection requirements.

- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

**END OF SECTION**

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**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including requirements of the Government's solicitation requirements and Division 1 Specifications Sections, apply to this Section.
- B. Section 04 2000 – Unit Masonry
- C. Section 07 2500 - Weather Barriers, includes transiton membrane.
- D. Section 07 6000 – Sheet Metal Flashing and Trim

**1.02 SUMMARY**

- A. Section provides for a flexible rubberized asphalt, self –sealing through-wall flashing and wall flashing, and stainless steel 26 gauge terminations at all dissimilar masonry transitions and general horizontal masonry drainage.
- B. Provide single source manufacturers for Section 07 2500 Weather Barrier, Section 07 6500 Wall Flashing, Termination Bars (refer to 04 2000), and termination bar sealants (refer to 07 9005) as required to ensure compatibly among all products installed as a part of the moisture control assembly at the exterior walls.
  - 1. Where single source cannot be provided, notify the Government and provide written verification from manufacturers of all products intended for installation to ensure products from multiple manufacturers are compatible and all specified warranties can be provided and maintained in full force and effect for the entirety of the specified warranty periods for each product.

**1.03 REFERENCES**

- A. American Society for Testing and Materials
  - 1. ASTM E 96 – Test Methods for Water Vapor Transmission of Materials.
  - 2. ASTM D 570 – Test method for Water Absorption of Plastics.
  - 3. ASTM E 154 – Test Method for Water Vapor Retarders used in contract with Earth Under Concrete Slabs, on Walls or as Ground Cover.
  - 4. ASTM D 1004 – Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
  - 5. ASTM D 1938 – Test Method for Tear Propagation's Resistance of Plastic Film and Thin Sheeting by a Single-Tear Method.
  - 6. ASTM D 1876 - Test Method for Peel Resistance of Adhesives.

7. ASTM D 1970 – Standard Specifications for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
8. ASTM D 412 – Test Methods for Vulcanized Rubber & Thermoplastic Rubbers and Thermoplastic Elastomers – Tension.
9. ASTM E 2357 - Air Barrier Assembly

#### **1.04 SUBMITTALS**

- A. Product Data and Shop Drawings: Submit for each product; Spec-Data®/Data Sheets, details and installation procedures.
- B. Test Reports: Indicating compliance with the performance requirements of this section.
- C. Samples of flashing.
- D. Mock-up: Refer to section 04 2000 Unit Masonry.
- E. Pre-installation meeting with Architect, Contracting Officer's Representative(s), Contracting Officer, Construction Manager, Window or Storefront Supplier, Masonry Contractor, Flashing Manufacturer, Waterproofing Subcontractor and others associated with the work.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with manufacturer's recommendations for storage and handling of each product.

#### **1.06 WARRANTY**

- A. Standard Product Warranty:
  1. Submit manufacturer's 5-year warranty at the end of this section, signed by the authorized General Contractor and the authorized Waterproofing Subcontractor. Date of warranty shall be established as the Beneficial Occupancy date.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Performance Requirements:
  1. Water Vapor Transmission: ASTM E 96, Method B-2.9 ng/m<sup>2</sup>sPa (0.05 perms) maximum.
  2. Water Absorption: ASTM D 570 – Max 0.1% by weight.
  3. Puncture Resistance: ASTM E 154 – 178 N (40 lbs.)

4. Tear Resistance:
    - a. Initiation – ASTM D 1004 – min. 58 N (13.0 lbs) M.D.
    - b. Propagation – ASTM D 1938 – min. 40 N (9.0 lbs) M.D.
  5. Lap Adhesion at -4°C (25°F): ASTM D 1876 – 880 N/M (5.0 lbs./in.) of width
  6. Low Temperature Flexibility: ASTM D 1970 – Unaffected to -43°C (-45°F).
    - a. Tensile Strength: ASTM D 412, Die C Modified – Min. 5.5 MPa (800 psi)
  7. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D 412, Die C – Min. 200%.
- B. Sealant for Termination Bar:
1. Provide manufacturers recommended sealant to insure compatibility with Air Barrier product be provided.
- C. Flashing Weeps – Mortar Nets, etc. Refer to Section 04 2000 “Unit Masonry” for additional installation requirements.
- D. Termination Bar
1. Stainless Steel Flashing and Special Sections: Provide 26 gauge 304 stainless steel flashing termination strips as recommended by manufacturer . Refer to flashing detail on drawings.
- E. Metal Drip Edge
1. Stainless steel flashing in special sections: provide 26 gauge with hemmed edge No. 304 with premanufactured inside and outside corners. Non-hemmed edges shall extend into wall cavity and turn up at a 45 degree angle for 3/4 inch. Front edge shall hem back 3/4". Font edge shall extend beyond brick 1/2". Set metal drip edge in full bed of sealant.
  2. Refer to Flashing details.
- F. Metal Jamb Flashing: .032 Mill Finish Aluminum - L-Shape, size and location as shown on drawings.
- G. Provide single source manufacturers for Section 07 2500 Weather Barrier, Section 07 6500 Wall Flashing, Termination Bars (refer to 04 2000), and termination bar sealants (refer to 07 9005) as required to ensure compatibly among all products installed as a part of the moisture control assembly at the exterior walls.
1. Where single source cannot be provided, notify the Government and provide written verification from manufacturers of all products intended for installation to ensure products from multiple manufacturers are compatible and all specified warranties can be provided and maintained in full force and effect for

the entirety of the specified warranty periods for each product.

H. Substitutions: See Section 01 6000 - Product Requirements

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

A. Examine conditions, with installer present, for compliance with requirements for installation, tolerances and other specific conditions affecting performance of flashing. Remove all deleterious materials from surfaces to be flashed.

#### **3.02 INSTALLATION**

A. General: Install flashing to dry surfaces at air and surface temperatures of -4°C (25°F) and above in accordance with manufacturer's recommendations at locations indicated on Construction Documents.

B. Flexible Wall Flashing – Referred to on drawings as “Through Wall Flashing” or “Flexible Flashing”: All flashing and accessories shall be installed in accordance with manufacturer's printed instructions, contract documents.

C. Accessories:

1. When required by dirty or dusty site conditions or by surfaces having irregular or rough texture, apply surface conditioner by spray, brush, or roller at the rate recommended by manufacturer, prior to flashing installation. Allow surface conditioner to dry completely before flashing application.
2. Apply Primer by brush or heavy nap, natural-material roller at rate recommended by manufacturer prior to flashing installation. Allow primer to dry completely before flashing application.
3. Provide stainless steel termination bar with a full bed of manufacturer's recommended sealant at the top of all flexible flashing. Refer to drawings for detail.
4. Encapsulate stainless steel termination bar with the vapor permeable, fluid applied membrane air barrier per the manufacturer's strict instructions.
5. Refer to drawings for details.

**DEPLOYABLE PARTS STORAGE  
DANNELLY FIELD, MONTGOMERY, AL**

**19084/FAKZ189366**

**TYPE B-3 (100%)  
APRIL 10, 2025**

**PROJECT WALL FLASHING WARRANTY**

**NAME OF PROJECT:**

\_\_\_\_\_

**PROJECT LOCATION:**

\_\_\_\_\_

**OWNER:**

\_\_\_\_\_

**GENERAL**

**CONTRACTOR:**

\_\_\_\_\_

**ADDRESS:**

\_\_\_\_\_

**DATE OF ACCEPTANCE:**

\_\_\_\_\_

**DATE OF EXPIRATION:**

\_\_\_\_\_

- D. The Water Flashing Contractor and the General Contractor do hereby certify that the wall flashing work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved wall flashing manufacturers' recommendations.
- E. The Water Flashing Contractor and the General Contractor do hereby guarantee the wall flashing and associated work including but not limited to all underground vertical and horizontal wall flashing to be water tight and free from all leaks, due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of Beneficial Occupancy of the project.
- F. Subject to the terms and conditions listed below, the Water Flashing Contractor and the General Contractor also guarantee that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the wall flashing manufacturers' recommendations as are necessary to correct faulty and defective work and/or materials which may develop in the work including. Anticipated life of the wall flashing systems and the best standards applicable to the particular wall flashing type in value and in accordance with construction documents as are necessary to maintain said work in watertight conditions, and further, to respond on or within seven (7) calendar days upon proper notification of leaks or defects by the Government.
  - 1. During the Guarantee Period, if the Government allows alteration of the work by anyone other the Water Flashing Contractor or the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything affected by, this Guarantee shall become null and void upon the date of said alterations

2. Future building additions will not void this Guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the wall flashed areas, and any damage caused by such addition. If this contract is for wall flashing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing.
  
3. The Government shall promptly notify the Water Flashing Contractor or the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Water Flashing Contractor or the General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

**IN WITNESS THEREOF, this instrument has been duly executed**

This \_\_\_\_\_ day of \_\_\_\_\_.

\_\_\_\_\_  
Wall Flashing Contractor's  
Signature

\_\_\_\_\_  
General Contractor's      Authorized  
Authorized Signature

\_\_\_\_\_  
Typed Name and Title

\_\_\_\_\_  
Typed Name and Title

\_\_\_\_\_  
Notary Public

**END OF SECTION**

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**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Roof-edge drainage systems.
- B. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS:**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Section 05 5000 – Metal Fabrications
- E. Section 06 1000 – Rough Carpentry
- F. Section 07 4113 – Metal Roof Panels
- G. Section 07 6200 – Sheet Metal Flashing and Trim
- H. Section 07 9200 – Joint Sealants

**1.03 PREINSTALLATION CONFERENCE:**

- A. Conduct conference at Project site.
- B. Meet with Contracting Officer, Contracting Officer Representative, Architect, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
- C. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
- D. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Sustainable Design Submittals:
  - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
- C. Shop Drawings: For roof specialties.
  - 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
  - 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
  - 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
  - 4. Detail termination points and assemblies, including fixed points.
  - 5. Include details of special conditions.
- D. Samples: For each type of roof specialty and for each color and texture specified.
- E. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- F. Samples for Verification:
  - 1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
  - 2. Include roof-edge specialties and roof-edge drainage systems made from 12-inch (300-mm) lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.
- G. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Total weight of products provided

### **1.05 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of roof specialty.
- C. Product Test Reports: For roof-edge flashings for tests performed by a qualified testing agency.
- D. Sample Warranty: For manufacturer's special warranty.

### **1.06 CLOSEOUT SUBMITTALS**

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

### **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class and SPRI ES-1 tested to specified design pressure.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.
  - 1. Build mockup of typical roof edge, including fascia, gutter, and downspout approximately 10 ft. (3.0 m) long, including supporting construction, seams, attachments, underlayment, and accessories.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless the Contracting Officer specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Beneficial Occupancy.

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

### **1.09 FIELD CONDITIONS**

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.

- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

### **1.10 WARRANTY**

- A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 07 0100 Special Project Roofing Warranty
- B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace 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 Delta E units when tested in accordance with ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Beneficial Occupancy.

## **PART 2 - PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Recycled Content: For Steel Products: Minimum Total Recovered Materials Content - 30%
- C. FM Approvals' Listing: Manufacture and install roof-edge specialties that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-105. Identify materials with FM Approvals' markings.
- D. SPRI Wind Design Standard: Manufacture and install roof-edge specialties tested in accordance with SPRI ES-1 and capable of resisting the following design pressures:
  - 1. Design Pressure: As indicated on Drawings.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent 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 calculations 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.

## **2.02 ROOF-EDGE DRAINAGE SYSTEMS**

A. Gutters: Manufactured in uniform section lengths not exceeding 12 ft. (3.6 m, with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.

1. Zinc-Coated Steel: Nominal [0.028-inch (0.71-mm)] [0.034-inch (0.86-mm)] thickness.
2. Gutter Profile: As indicated on the drawings and in accordance with SMACNA's "Architectural Sheet Metal Manual."
3. Corners: Factory mitered and continuously welded.
4. Gutter Supports: Gutter brackets and Straps as recommended by manufacturer for application and required performance standards.
5. Special Fabrications: [Radiussed sections] .
6. Gutter Accessories: Continuous snap-in plastic leaf guard

B. Downspouts: Plain rectangular complete with mitered elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.

1. Zinc-Coated Steel: Nominal 0.034-inch (0.86-mm) thickness.
2. Copper: [16 oz./sq. ft. (0.55 mm thick)] .

C. Zinc-Coated Steel Finish: Three-coat fluoropolymer

1. Color: As selected by the Government from manufacturer's full range

## **2.03 MATERIALS**

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation.

B. Aluminum Sheet: ASTM B209 (ASTM B209M), alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

- C. Aluminum Extrusions: ASTM B221 (ASTM B221M), alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
- D. Recycled Content: For Steel Products - Minimum Total Recovered Materials Content: 30%

#### **2.04 UNDERLAYMENT MATERIALS**

- A. Refer to section 07 4113

#### **2.05 MISCELLANEOUS MATERIALS**

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
  - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
  - 2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
  - 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel in accordance with ASTM A153/A153M or ASTM F2329.
- B. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

#### **2.06 FINISHES**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted 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 unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to

minimize contrast.

**D. Coil-Coated Galvanized-Steel Sheet Finishes:**

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A755/A755M and coating and resin manufacturers' written instructions.
  - a. Three-Coat Metallic Fluoropolymer: AAMA 621. Fluoropolymer finish with suspended metallic flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

**E. Coil-Coated Aluminum Sheet Finishes:**

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - a. Three-Coat Metallic Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended metallic flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

**F. Aluminum Extrusion Finishes:**

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - a. Three-Coat Metallic Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended metallic flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 INSTALLATION OF UNDERLAYMENT**

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
  1. Apply continuously under roof-edge specialties.
  2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.

#### **3.03 INSTALLATION, GENERAL**

- A. Install roof specialties in accordance with manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
  1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
  2. Provide uniform, neat seams with minimum exposure of solder and sealant.
  3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
  4. Torch cutting of roof specialties is not permitted.

5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  1. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
  1. Space movement joints at a maximum of 12 ft. (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise indicated on Drawings.
  2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

### **3.04 INSTALLATION OF ROOF-EDGE SPECIALITIES**

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

### **3.05 INSTALLATION OF ROOF-EDGE DRAINAGE-SYSTEM**

- A. Install components to produce a complete roof-edge drainage system in accordance with manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 24 inches (610 mm) apart. Attach ends with rivets and seal with sealant to make watertight. Slope to

downspouts.

1. Install gutter with expansion joints at locations indicated but not exceeding 50 ft. (15.2 m) apart. Install expansion-joint caps.
  2. Install continuous leaf guards on gutters with noncorrosive fasteners, removable for cleaning gutters.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c.
1. Connect downspouts to underground drainage system indicated.

### **3.06 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 roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

**END OF SECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping of all joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not.
- B. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-5.3.2 - Reduce Volatile Organic Compounds (VOC) Low-Emitting Materials
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions
- E. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

**1.03 REFERENCE STANDARDS**

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems 2015 (Reapproved 2019).
- D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems 2020a.
- E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers 2020a.
- F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015 (Reapproved 2021)e1.
- G. ITS (DIR) - Directory of Listed Products current edition.

- H. FM 4991 - Approval Standard for Firestop Contractors 2013.
- I. FM (AG) - FM Approval Guide current edition.
- J. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).
- K. UL 1479 - Standard for Fire Tests of Penetration Firestops Current Edition, Including All Revisions.
- L. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.
- M. UL (DIR) - Online Certifications Directory Current Edition.
- N. UL (FRD) - Fire Resistance Directory Current Edition.

#### **1.04 SUBMITTALS**

- A. See Section 013001 - Submittals 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. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. VOC Content Limitations: For the specified products, submit documentation of conformance with Specification Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- G. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content
    - b. Total weight of products provided
  - 2. For products having Biologically Based Products, documentation indicating percentages of Biologically-Based Products
  - 3. For products containing VOCs, documentation (material safety data sheets (MSDS), third-party certificates, or test reports) showing printed statement of VOC content.

### **1.05 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
  - 1. Trained by manufacturer.
  - 2. Approved by Factory Mutual Research Corporation under FM 4991
  - 3. Verification of minimum three years documented experience installing work of this type.
  - 4. Verification of at least five satisfactorily completed projects of comparable size and type.

### **1.06 FIELD CONDITIONS**

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

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than the requirements included in specification section 016116 - Volatile Organic Compound (VOC) Content Restrictions
- B. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- D. Fire Ratings: Refer to drawings for required systems and ratings.

### **2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS**

- A. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of

penetrated assembly.

1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
2. Watertightness: Provide systems that have been tested to show W Rating as indicated.
3. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

### **2.03 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION**

#### **A. Blank Openings:**

1. In Floors or Walls:
  - a. 2 Hour Construction: UL System C-AJ-0090
  - b. 2 Hour Construction: UL System C-AJ-0015
  - c. 2 Hour Construction: UL System C-AJ-0116
  - d. 2 Hour Construction: UL System C-AJ-0136

#### **B. Penetrations Through Floors or Walls By:**

1. Multiple Penetrations in Large Openings:
  - a. 2 Hour Construction: UL System C-AJ-8143
  - b. 2 Hour Construction: UL System C-AJ-8035
  - c. 2 Hour Construction: UL System C-AJ-8055
  - d. 2 Hour Construction: UL System C-AJ-8093
  - e. 2 Hour Construction: UL System C-AJ-8114
  - f. 2 Hour Construction: UL System C-AJ-8115
  - g. 2 Hour Construction: UL System C-AJ-8181
  - h. 2 Hour Construction: UL System C-AJ-8220
2. Uninsulated Metallic Pipe, Conduit, and Tubing:
  - a. 2 Hour Construction: UL System C-AJ-1090
  - b. 2 Hour Construction: UL System C-AJ-1198
  - c. 2 Hour Construction: UL System C-AJ-1226

- d. 2 Hour Construction: UL System C-AJ-1240
  - e. 2 Hour Construction: UL System C-AJ-1425
  - 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System C-AJ-2167
    - b. 2 Hour Construction: UL System C-AJ-2109;
    - c. 2 Hour Construction: UL System C-AJ-2106; Specified Technologies Inc. SSW wrap strips.
    - d. 2 Hour Construction: UL System C-AJ-2106
    - e. 2 Hour Construction: UL System C-AJ-2282
    - f. 2 Hour Construction: UL System C-AJ-2297
    - g. 2 Hour Construction: UL System C-AJ-2297; Specified Technologies Inc. SSW wrap strips.
    - h. 2 Hour Construction: UL System C-AJ-2298; Specified Technologies Inc. LCC Intumescent Firestop Collars.
    - i. 2 Hour Construction: UL System C-AJ-2298
    - j. 2 Hour Construction: UL System C-AJ-2588
    - k. 2 Hour Construction: UL System C-AJ-2772
    - l. 2 Hour Construction: UL System C-BJ-2021
  - 4. Insulated Pipes:
    - a. 2 Hour Construction: UL System C-AJ-5048
    - b. 2 Hour Construction: UL System C-AJ-5087
    - c. 2 Hour Construction: UL System C-AJ-5091
    - d. 2 Hour Construction: UL System C-AJ-5138
    - e. 2 Hour Construction: UL System C-AJ-5313
  - 5. HVAC Ducts, Uninsulated:
    - a. 2 Hour Construction: UL System C-AJ-7111
- C. Penetrations Through Floors By:
- 1. Multiple Penetrations in Large Openings:
    - a. 2 Hour Construction: UL System F-A-8012

2. Uninsulated Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System F-A-1129
  3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System F-A-2213
    - b. 2 Hour Construction: UL System F-A-2216
- D. Penetrations Through Walls By:
1. Uninsulated Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System W-J-1067
  2. Electrical Cables Not In Conduit:
    - a. 2 Hour Construction: UL System C-AJ-3095
    - b. 2 Hour Construction: UL System C-AJ-3216
    - c. 2 Hour Construction: UL System W-J-3090
    - d. 2 Hour Construction: UL System W-J-3098; Specified Technologies Inc. EZ-Path Series 33 Fire-Rated Pathway.
    - e. 2 Hour Construction: UL System W-J-3098
    - f. 2 Hour Construction: UL System W-J-3130
    - g. 2 Hour Construction: UL System W-J-3138
    - h. 2 Hour Construction: UL System W-J-3141
    - i. 2 Hour Construction: UL System W-J-3156
    - j. 2 Hour Construction: UL System W-J-3158
    - k. 2 Hour Construction: UL System W-J-3180
    - l. 2 Hour Construction: UL System W-J-3182; Specified Technologies Inc. Ready Split Sleeve.
  3. Insulated Pipes:
    - a. 2 Hour Construction: UL System C-AJ-5090
    - b. 2 Hour Construction: UL System C-AJ-5091
  4. HVAC Ducts, Uninsulated:
    - a. 2 Hour Construction: UL System W-J-7092

- b. 2 Hour Construction: UL System W-J-7109
- 5. HVAC Ducts, Insulated:
  - a. 2 Hour Construction: UL System W-J-7112

## **2.04 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS**

### **A. Blank Openings:**

- 1. 2 Hour Construction: UL System W-L-0020
- 2. 2 Hour Construction: UL System W-L-0032
- 3. 2 Hour Construction: UL System W-L-0038
- 4. 2 Hour Construction: UL System W-L-3334
- 5. 1 Hour Construction: UL System W-L-0020
- 6. 1 Hour Construction: UL System W-L-0032
- 7. 1 Hour Construction: UL System W-L-0038
- 8. 1 Hour Construction: UL System W-L-3334

### **B. Penetrations By:**

- 1. Multiple Penetrations in Large Openings:
  - a. 2 Hour Construction: UL System W-L-1408
  - b. 2 Hour Construction: UL System W-L-8013
  - c. 2 Hour Construction: UL System W-L-8025
  - d. 2 Hour Construction: UL System W-L-8050
  - e. 2 Hour Construction: UL System W-L-8071
  - f. 2 Hour Construction: UL System W-L-8073
  - g. 2 Hour Construction: UL System W-L-8079
  - h. 1 Hour Construction: UL System W-L-1408
  - i. 1 Hour Construction: UL System W-L-8013
  - j. 1 Hour Construction: UL System W-L-8025
  - k. 1 Hour Construction: UL System W-L-8050
  - l. 1 Hour Construction: UL System W-L-8071
  - m. 1 Hour Construction: UL System W-L-8073

- n. 1 Hour Construction: UL System W-L-8079
- 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
  - a. 2 Hour Construction: UL System W-L-1033
  - b. 2 Hour Construction: UL System W-L-1049
  - c. 2 Hour Construction: UL System W-L-1090
  - d. 2 Hour Construction: UL System W-L-1054
  - e. 2 Hour Construction: UL System W-L-1164
  - f. 2 Hour Construction: UL System W-L-1222
  - g. 2 Hour Construction: UL System W-L-1477
  - h. 2 Hour Construction: UL System W-L-1506
  - i. 1 Hour Construction: UL System W-L-1042
  - j. 1 Hour Construction: UL System W-L-1049
  - k. 1 Hour Construction: UL System W-L-1054
  - l. 1 Hour Construction: UL System W-L-1090
  - m. 1 Hour Construction: UL System W-L-1164
  - n. 1 Hour Construction: UL System W-L-1222
  - o. 1 Hour Construction: UL System W-L-1477
  - p. 1 Hour Construction: UL System W-L-1506
- 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
  - a. 2 Hour Construction: UL System W-L-2048
  - b. 2 Hour Construction: UL System W-L-2074
  - c. 2 Hour Construction: UL System W-L-2078
  - d. 2 Hour Construction: UL System W-L-2128
  - e. 2 Hour Construction: UL System W-L-2237
  - f. 2 Hour Construction: UL System W-L-2241
  - g. 2 Hour Construction: UL System W-L-2243
  - h. 2 Hour Construction: UL System W-L-2493
  - i. 1 Hour Construction: UL System W-L-2048

- j. 1 Hour Construction: UL System W-L-2074
  - k. 1 Hour Construction: UL System W-L-2078
  - l. 1 Hour Construction: UL System W-L-2128
  - m. 1 Hour Construction: UL System W-L-2237
  - n. 1 Hour Construction: UL System W-L-2241
  - o. 1 Hour Construction: UL System W-L-2243
  - p. 1 Hour Construction: UL System W-L-2493
4. Insulated Pipes:
- a. 2 Hour Construction: UL System W-L-5014
  - b. 2 Hour Construction: UL System W-L-5028
  - c. 2 Hour Construction: UL System W-L-5029
  - d. 2 Hour Construction: UL System W-L-5121
  - e. 2 Hour Construction: UL System W-L-5273
  - f. 2 Hour Construction: UL System W-L-5298
  - g. 1 Hour Construction: UL System W-L-5014
  - h. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
  - i. 1 Hour Construction: UL System W-L-5028
  - j. 1 Hour Construction: UL System W-L-5029
  - k. 1 Hour Construction: UL System W-L-5121
  - l. 1 Hour Construction: UL System W-L-5273
  - m. 1 Hour Construction: UL System W-L-5298
5. HVAC Ducts, Insulated:
- a. 2 Hour Construction: UL System W-L-7156
  - b. 2 Hour Construction: UL System W-L-7164; Specified Technologies Inc. FyreFlange HVAC Firestop Angle.
  - c. 2 Hour Construction: UL System W-L-7164
  - d. 2 Hour Construction: UL System W-L-7238

- e. 1 Hour Construction: UL System W-L-716
- f. 1 Hour Construction: UL System W-L-7238
- g. 1 Hour Construction: UL System W-L-7156

## **2.05 FIRESTOPPING SYSTEMS**

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

#### **3.03 INSTALLATION**

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

#### **3.04 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

#### **3.05 PROTECTION**

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

### **END OF SECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sealants and joint backing.
- B. Precompressed foam sealers.
- C. Product Data for HPSB Compliance: For adhesives, including printed statement of VOC content.
- D. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-5.3.2 - Reduce Volatile Organic Compounds (VOC) Low-Emitting Materials
  - 2. 2-6.1.2 - Biologically Based Products
  - 3. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions
- E. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers.
- F. Section 088000 - Glazing: Glazing sealants and accessories.

**1.03 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants 2017.
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2018.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- D. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).

**1.04 SUBMITTALS**

- A. Section 01 3001 - Submittals

- B. VOC Content Limitations: For the specified products, submit documentation of conformance with Specification Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- C. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, provide documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Include the total weight of products provided
  - 2. For products having Biologically Based Products, documentation indicating percentages of Biologically-Based Products
  - 3. For products containing VOCs, documentation (material safety data sheets (MSDS), third-party certificates, or test reports) showing printed statement of VOC content.
  - 4. For the specified products, submit documentation of conformance with Specification Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- D. Product Data: Provide data indicating sealant chemical characteristics.
- E. Samples: Submit two samples illustrating sealant colors for selection.
- F. Manufacturer's Installation Instructions: Indicate special procedures.

### **1.05 QUALITY ASSURANCE**

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

### **1.06 MOCK-UP**

- A. Refer to 01 4000.

### **1.07 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

### **1.08 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a the specified warranty periods.
  - 1. Unless noted otherwise, provide manufacturer's standard 5 year material warranty.
  - 2. Provide additional manufacturer's warranties listed for specific products.
- C. Provide General Contractor's Project Joint Sealant Warranty at the back of this specification section. Warranty to be signed by the Joint Sealant Contractor and General Contractor.
- D. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

### **1.09 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with with a high recycled content:
  - 1. See Part 2 of this specification section for specific recycled content thresholds, if applicable.
- B. Contractor shall endeavor to provide materials with a high Biobased content where possible.
  - 1. See Part 2 of this specification section for specific biobased content thresholds, if applicable.
- C. Contractor shall endeavor to provide materials with the lowest possible VOC content.

## **PART 2 PRODUCTS**

### **2.01 SEALANTS**

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Type I - General Purpose Exterior Sealant: Silicone ; ASTM C 920, Grade NS, Class 25, Uses M ; single component, ultra low-mod.
  - 1. Movement Capability: Plus 100 percent and minus 50 percent, minimum in accordance with ASTM C719
  - 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.

3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
  4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
  5. Elongation: 1,000% when testing in accordance with ASTM D412
  6. Tensile Strength: 120 psi, ultimate, when testing in accordance with ASTM D412
  7. Tear Strength: 30ppi, ultimate, when testing in accordance with ASTM D624
  8. Ozone/UV Resistance: Excellent.
  9. Service Temperature Range: [-60] to [300] degrees F ([-51] to [149] degrees C).
  10. Color: To be selected by the Government from manufacturer's full range.
  11. Applications: Use for:
    - a. Vertical and horizontal construction joints between masonry/concrete/stone to masonry/concrete/stone.
  12. Warranties: In addition to manufacturer's standard product warranties, Provide manufacturer's 20 year Non-Staining and 20 year Structural Adhesion limited warranties. Provide manufacturer's compatibility testing as required.
- C. Type II - General Purpose Exterior Sealant: Silicone ; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; ot expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent, minimum.
  2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661
  3. Cure Type: Single-component, neutral moisture curing
  4. Service Temperature Range: [-60 to 300] degrees F ([-51 to 149] degrees C).
  5. Elongation: 700% when testing in accordance with ASTM D412
  6. Tensile Strength: 200 psi, ultimate, when testing in accordance with ASTM D412
  7. Tear Strength: 40 ppi, ultimate, when testing in accordance with ASTM D624
  8. Peel Strength: 30 pli, when tested in accordance with ASTM C794
  9. Ozone/UV Resistance: Excellent, when tested in accordance with ASTM D1149

10. Color: To be selected by the The Government from manufacturer's full range.
  11. Applications: Use for:
    - a. All other vertical and horizontal construction joints not listed in sealant type I & III.
  12. Warranties: In addition to manufacturer's standard product warranties, Provide manufacturer's 20 year Non-Staining and 20 year Sructural Adhesion limited warranties. Provide manufacturer's compatibility testing as required.
- D. Type III - Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
1. Face color: match adjacent materials.
  2. Size as required to provide weathertight seal when installed.
  3. None staining in accordance with ASTM C510
  4. Excellent UV Resistance
  5. Excellent Resistance to Aging
  6. Excellent Mildew Resistant
  7. 21 psi min (145 kPa) tensile strength in accordance with ASTM D3574
  8. 0.34 Btu. in/hr. ft<sup>2</sup> - °F (0.05 w/m °C) Thermal Conductivity in accordance with ASTM C518
  9. Rate of Air Leakage Through Curtain Walls in accordance with ASTM E283: Passed.
  10. Water Penetration of Curtain Walls by Uniform Static Air Pressure Difference in accordance with ASTM E331: Passed, upt ot 20.88 PSF
  11. Structural Performance of Curtain Walls by Uniform Air Presssure Difference (Gust Loads) in accordance with ASTM E330: Passed: + 62.66 PSF, -56.39 PSF
  12. Applications: Use for:
    - a. Exterior wall expansion joints used in conjunction with sealant Type I.
- E. Type IV - General Purpose Interior Sealant: Siliconized Acrylic Latex; ASTM C 834, Type OP, single component, paintable.
1. Extrudability, ASTM C1183: 6 g/s
  2. Artificial Weathering, ASTM C732: Passes

3. Wash Out, ASTM C732: None
  4. Slump:
    - a. ASTM C732: None
    - b. ASTM D2202: 2 mm
  5. Cracking, ASTM C732: None
  6. Discoloration, ASTM C732: None
  7. Adhesion Loss, ASTM C732: None
  8. Volume Shrinkage, ASTM C1241: 22.4% (Type OP), 35.3% (Type C)
  9. Low Temp Flexibility, ASTM C734: Non cracks, no adhesion loss
  10. Extension - Recovery, ASTM C736: 93.7%
  11. Extension - Adhesion, ASTM C736: None
  12. Stain Index, ASTM D2203: 0 mm
  13. Movement Capability: +/-12.5%
  14. Flame Spread, ASTM E84: 10
  15. Smoke Development, ASTM E84: 0
  16. Color: To be selected by the The Government from manufacturer's standard range.
  17. Applications: Use for:
    - a. Interior wall and ceiling control joints.
    - b. Other interior joints for which no other type of sealant is indicated.
- F. Type V - General Purpose Interior Sealant: Medium Modulus silicone sealant
1. Movement Capability: Plus and minus 50 percent, minimum.
  2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661
  3. Cure Type: Single-component, neutral moisture curing
  4. Service Temperature Range: [-60 to 300] degrees F ([-51 to 149] degrees C).
  5. Elongation: 700% when testing in accordance with ASTM D412
  6. Tensile Strength: 200 psi, ultimate, when testing in accordance with ASTM D412

7. Tear Strength: 40 ppi, ultimate, when testing in accordance with ASTM D624
  8. Peel Strength: 30 pli, when tested in accordance with ASTM C794
  9. Ozone/UV Resistance: Excellent, when tested in accordance with ASTM D1149
  10. Color: To be selected by the The Government from manufacturer's full range.
  11. Color: To be selected by the The Government from manufacturer's standard range.
  12. Applications: Use for:
    - a. Joints between aluminum door and window frames and adjacent wall surfaces.
- G. Type VI - Bathtub/Tile Sealant: White silicone; ASTM C920, Uses M and A; single component, neutral curing, mildew resistant.
1. Cyclic Movement, ASTM C719: +/- 50
  2. Elongation, Ultimate, ASTM D412: 450
  3. Hardness (Shore A), ASTM C661: 25-35
  4. Ozone/UV Resistance: Excellent
  5. Peel Adhesion, ASTM C794: Pass
  6. Service Temperature Rang (°F): -60 to 100
  7. Tensile Strength, ASTM C1135
    - a. 100% Elongation (psi): 45-55
    - b. Ultimate (psi): 165
  8. Fungi Resistance, ASTM G21: No growth < 2 ug
  9. Applications: Use for:
    - a. Joints between plumbing fixtures and floor and wall surfaces.
    - b. Joints between kitchen and bath countertops and wall surfaces.
- H. Type VII - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A; multi- component, type M
1. % Solids: 92%
  2. Specific Gravity: 1.2

3. Extrusion Rate, ASTM C1183: 4 seconds
  4. Hardness, ASTM C661: 30 to 35
  5. Weight Loss, ASTM C1246: 12%
  6. Stain and Color Change, ASTM C510: No visible color change, No stain
  7. Accelerated Weathering, ASTM C793: Passes
  8. Movement Capability, ASTM C719: +/- 25%
  9. Tensile Strength, ASTM D412: 200 to 250 psi
  10. Elongation, ASTM D412: 500 to 650%
  11. Color: To be selected by the The Government from manufacturer's full range.
  12. Applications: Use for:
    - a. Expansion joints in floors.
    - b. Joints between hard floor tile and hard floor tile and hard floor tile and adjacent wall surfaces for hard tile expansion joints.
- I. Type VIII - Concrete Joint Sealant: Polyurethane; ASTM C 920, Class 50, Uses T, and M; multi- component (type M), Grade NS vertical and horizontal
1. % Solids: 92%
  2. Specific Gravity: 1.06
  3. Low Temp Flexibility, ASTM C793: Passes at -15 °F (-9° C)
  4. Hardness, ASTM C661: 30 +/-3
  5. Weight Loss, ASTM C1246: Passes
  6. Stain and Color Change, ASTM C510: No color change, No stain
  7. Adhesion-in-Peel, ASTM C794: >10 pli (pass)
  8. Accelerated Weathering, ASTM C793: Passes
  9. Movement Capability, ASTM C719: +/- 50%
  10. Color: as selected by the Government from manufacturer's full range of colors..
  11. Applications: Use for:
    - a. Joints in sidewalks and curb and gutters
    - b. Joints in concrete walls

## **2.02 ACCESSORIES**

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application, and compatible with joint substrates.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
  - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
  - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
  - 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
  - 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
  - 5. All backer rods shall be as recommended by sealant manufacturer for specific use.
- D. Tooling Agent: Agent recommended by material manufacturer to ensure contact of material with inner joint faces.
- E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application. Provide self adhering tape where applicable.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### **3.02 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.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.
- H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch (3 to 6 mm) below adjoining surface.

### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

### **3.05 PROTECTION**

- A. Protect sealants until cured.

**PROJECT**

: \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**OWNER**

: \_\_\_\_\_

**WATERPROOFING**

**CONTRACTOR** \_\_\_\_\_

—

**ADDRESS** \_\_\_\_\_

—

**DATE OF ACCEPTANCE** \_\_\_\_\_ **DATE OF**  
**EXPIRATION** \_\_\_\_\_

- A. The joint sealant contractor and general contractor do hereby certify that the above and underground work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved joint sealants manufacturers' recommendations.
- B. The joint sealant contractor and general contractor do hereby guarantee the joint sealants and associated work including but not limited to all above and underground vertical and horizontal joint sealants to be water tight and free from all leaks, due to faulty or defective materials and workmanship for a period of ten (10) years, starting on the date of Beneficial Occupancy of the project.
- C. Subject to the terms and conditions listed below, the joint sealants contractor and general contractor also guarantee that during the guarantee period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the joint sealant manufacturers recommendations as are necessary to correct faulty and defective work and/or materials which may develop in the work including. Anticipated life of the joint sealant systems and the best standards applicable to the particular joint sealant type in value and in accordance with construction documents as are necessary to maintain said work in watertight conditions, and further, to respond on or within seven (7) calendar days upon proper notification of leaks or defects by the Government.
- D. During the guarantee period, if the Government allows alteration of the work by anyone other the joint sealant contractor or general contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything affected by, this guarantee shall become null and void upon the date of said alterations.

- E. Future building additions will not void this guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the joint sealant areas, and any damage caused by such addition. If this contract is for joint sealant of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing.
- F. The Government shall promptly notify the Joint Sealant Contractor or General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Joint Sealant Contractor or General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

**IN WITNESS THEREOF,**

THIS INSTRUMENT HAS BEEN DULY EXECUTED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_(YEAR).

\_\_\_\_\_

GENERAL CONTRACTOR'S JOINT SEALANT CONTRACTOR  
CONTRACTOR'S AUTHORIZED AUTHORIZED SIGNATURE SIGNATURE

\_\_\_\_\_ TYPED  
NAME AND TITLE            TYPED NAME AND TITLE

\_\_\_\_\_

Notary Public

**END OF SECTION**

**SECTION 081113 - HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Thermally insulated hollow metal doors with frames.
- D. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. . Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product RequirementsContent Restrictions
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 04 2000 - Unit Masonry
- F. Section 087100 - Door Hardware.
- G. Section 088000 - Glazing: Glass for doors and borrowed lites.
- H. Section 099113 - Exterior Painting: Field painting.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames 2007 (Reaffirmed 2011).
- D. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.

- E. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- F. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.
- K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.
- L. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2007.
- M. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.
- N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- O. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.
- P. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.
- Q. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- R. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, 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 standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Total weight of products provided

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation requirements.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## **PART 2 PRODUCTS**

### **2.01 DESIGN CRITERIA**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
  - 4. Door Edge Profile: Manufacturers standard for application indicated.
  - 5. Typical Door Face Sheets: Flush.
  - 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.

7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
  8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.
- C. Product Performance:
1. Air leakage for fenestration and doors shall be determined in accordance with NFRX 400. Air leakage shall be determined by a laboratory accredited by a nationally recognized accreditation organization, such as the National Fenestration Rating Council, and shall be labeled and certified by the manufacturer.
    - a. Air leakage shall not exceed 1.0 cfm/ft<sup>2</sup> for glazed swinging entrance doors and 0.4 cfm/ft<sup>2</sup> for all other products.
  2. U-factors shall be determined in accordance with NFRC 100. U-Factors shall be determined by a laboratory accredited by a nationally recognized accreditation organization, such as the National Fenestration Rating Council, and shall be labeled and certified by the manufacturer.
    - a. Assembly U-value for opaque doors shall not exceed 0.700.
  3. Labeling of Doors: The U-factor and the air leakage rate for all manufactured doors installed between conditioned space, semi-heated space, unconditioned space, and exterior space shall be identified on a permanent name-plate installed on the product by the manufacturer.

## **2.02 MATERIALS**

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS, Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS, Type B.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A40 metallic coating.

- D. Recycled Content: For Steel Products: Minimum Total Recovered Materials Content - 30%

### **2.03 HOLLOW METAL DOORS**

- A. NL Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Insulated and designed to meet or exceed the requirements of UFC 4-010-01.
    - b. Level 2 - Heavy-duty.
    - c. Physical Performance Level B 500 000 cycles; in accordance with ANSI/SDI A250.4.
    - d. Model 1 - Full Flush.
    - e. Door Face Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
  2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  3. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
  4. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C 1363 .
  5. Weatherstripping: Refer to Section 087100.
- B. NL HM Interior Doors, Fire Rated and Non-Fire Rated:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B 500 000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
  2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  3. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
- C. Hardware Reinforcement: ANSI/SDI A250.6-1997.

## **2.04 HOLLOW METAL FRAMES**

- A. Comply with Standards and /or custom guidelines as indicated for corresponding doors in accordance with applicable door frame requirements.
- B. Exterior Door Frames: Full profile welded type.
  - 1. *Full profile/continuously welded type.*
    - a. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
    - b. Weatherstripping in Hardware Specification Section: 08 7000.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
  - 1. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch (150 mm), maximum, above floor at 45 degree angle.
  - 2. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
- D. Hardware Reinforcement: ANSI/SDI A250.6.
- E. All frames are to wrap the entire wall. No butt conditions will be acceptable. Coordinate frame jamb depths with each wall condition.

## **2.05 ACCESSORIES**

- A. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.
- B. Stops and Moldings:
  - 1. Moldings for Glazed Lites in Doors & Windows: Minimum 0.032-inch (0.8 mm) thick, same material as door face sheet. Metal lite kits are to be flush and shall not require shim kits for door hardware.
  - 2. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.
  - 3. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, same material as frames.
- C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
    - a. Jamb Anchors:
      - 1) Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with

corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.

- 2) Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
  - 3) Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
  - 4) Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- b. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:
- 1) Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  - 2) Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (50-mm) height adjustment. Terminate bottom of frames at finish floor surface.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- F. Mineral-Fiber Insulation: ASTM C 665, Type I.

## **2.06 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

## **2.07 FABRICATION**

- A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- B. Hollow Metal Doors:
1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration with flush door cap.
  2. Glazed Lites: Factory cut openings in doors.
  3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.

- C. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  6. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      - 1) Two anchors per jamb up to 60 inches (1524 mm) high.
      - 2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      - 3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
      - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
      - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
      - 5) Two anchors per head for frames more than 42 inches (1066 mm) wide and mounted in metal-stud partitions.

7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers.
  - a. Single-Door Frames: Three door silencers.
  - b. Double-Door Frames: Two door silencers.
- D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."
  1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 16 electrical Sections.
- E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
  1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  4. Provide loose stops and moldings on inside of hollow metal work.
  5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

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

### **3.02 PREPARATION**

### **3.03 INSTALLATION**

- A. Hollow Metal Frames and Stainless Steel Frames: Comply with ANSI/SDI A250.11.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable glazing stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
    - h. Remove temporary “shipping spreader bars” before installation.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
  4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  5. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

6. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
  - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- B. 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 (3 mm) plus or minus 1/16 inch (1.6 mm).
    - b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors according to NFPA 105.
- C. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with hollow metal manufacturer's written instructions.
  1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.

### **3.04 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified door and frame standards or custom guidelines indicated.
- B. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

### **3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

- B. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- C. 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.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

### **3.06 SCHEDULE**

- A. Refer to Door and Frame Schedule on the drawings.

### **END OF SECTION**

**SECTION 083100 - ACCESS DOORS AND PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire Rated Access Door and Frame Units, in Wall Locations.
- B. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 099113 - Exterior Painting: Field paint finish.

**1.03 REFERENCE STANDARDS**

- A. ITS (DIR) - Directory of Listed Products current edition.

**1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.
- E. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Total weight of products provided

**2.01 WALL UNITS**

- A. Non-Fire Rated Door and Frame Units: Formed steel.
  - 1. Frames and flanges: 0.058 inch (1.5 mm) steel.
  - 2. Door panels: 0.070 inch (1.8 mm) single thickness steel sheet at interior panels.
  - 3. Door panels: 0.070 inch (1.8 mm) double sheet with integral non-combustible insulation filler at exterior panels.
  - 4. Sizes:
    - a. Walls: 36 x 36 inches.
    - b. Ceilings: 36 x 36 inches.
  - 5. Hardware:
    - a. Hinge: 175 degree steel piano hinge with removable pin.
    - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
    - c. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
  - 6. Prime coat with alkyd primer.
  - 7. Finish: Field Paint - Refer to 09 9000
- B. Fire Rated Door and Frame Units: Formed Steel.
  - 1. Frames and Flanges: 16 gage door, 16 gage mounting frame, 1" wide flange.
  - 2. Sizes: 36" x 36"
  - 3. Refer to drawing for location of access panels.
  - 4. Hardware:
    - a. Hinge: 175 degree steel piano hinge with removable pin.
    - b. Lock: Cylinder lock with latch, two keys for each unit.
  - 5. Prime coat with alkyd primer.
  - 6. Fire Rating as indicated on drawings and door schedule.
- C. Recycled Content: For Steel Products: Minimum Total Recovered Materials Content - 30%

**3.01 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.

**3.02 INSTALLATION**

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

**END OF SECTION**

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**SECTION 083323 - OVERHEAD COILING DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Overhead coiling doors , operating hardware, non-fire-rated and exterior, electric operation.
- B. Wiring from electric circuit disconnect to operator to control station.
- C. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 087100 - Door Hardware: Cylinder cores and keys.
- E. Division 26 0000 - Electrical
- F. Section 260583 - Wiring Connections: Power to disconnect.
- G. Section 260583 - Wiring Connections: Power to disconnect.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- E. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts 2000, with Errata (2008).
- F. NEMA MG 1 - Motors and Generators 2018.

G. UL (DIR) - Online Certifications Directory Current Edition.

#### **1.04 SUBMITTALS**

- A. Product Data: Provide general construction, component connections and details, electrical equipment .
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- C. Manufacturer's Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
- D. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.
- E. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Total weight of products provided

#### **1.05 QUALITY ASSURANCE**

- A. Products Requiring Electrical Connection: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

### **PART 2 PRODUCTS**

#### **2.01 COILING DOORS**

- 1. Capable of withstanding positive and negative wind loads of 20 psf (940 Pa), without undue deflection or damage to components.
- 2. Sandwich slat construction with insulated core of polyurethane type insulation, unless otherwise noted.
  - a. Minimum R Value of Door Assembly to be R=7
- 3. Nominal Slat Size: 2 inches (50 mm) wide x required length.
- 4. Finish: Factory painted, custom color.
- 5. Guides: Angles; galvanized steel.
- 6. Hood Enclosure: Manufacturer's standard; primed steel.

7. Electric operation.
  8. Mounting: As indicated.
- B. Non-Fire-Rated Interior Coiling Doors: Steel slat curtain.
1. Nominal Slat Size: 2 inches (50 mm) wide x required length.
  2. Finish: Factory painted, custom color.
  3. Guides, Angles: Primed steel.
  4. Hood Enclosure: Manufacturer's standard; primed steel.
  5. Electric operation.
  6. Mounting: As indicated on drawings.
  7. Locking Devices: Lock and latch handle on outside.

## **2.02 MATERIALS**

- A. Curtain Construction: Interlocking slats.
1. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
  2. Weatherstripping: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.
  3. Steel Slats: Minimum thickness, 24 gage, .020 inch (0.511 mm); ASTM A653/A653M galvanized steel sheet.
- B. Steel Guides: ASTM A36/A36M steel angles, size as required for wind loading, hot-dip galvanized per ASTM A 123/A 123M.
- C. Hood Enclosure: Internally reinforced to maintain rigidity and shape.
- D. Hardware:
1. For motor operated units, additional lock or latching mechanisms are not required.
  2. Latching: Inside mounted, adjustable keeper, spring activated latch bar with feature to keep in locked or retracted position.
- E. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb (10 kg) nominal force to operate.

- F. Recycled Content: For Steel Products: Minimum Total Recovered Materials Content - 30%

### **2.03 ELECTRIC OPERATION**

- A. Electric Operators for doors sized up to 12'x12'
1. Mounting: Side mounted.
  2. Motor Enclosure:
    - a. Exterior doors: NEMA MG 1 Type 4; open drip proof.
    - b. Interior doors: NEMA MG 1 Type 1; open drip proof.
  3. Motor Rating: 1 hp; continuous duty.
  4. Motor Voltage: 120 volts, single phase, 60 Hz.
  5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  6. Controller Enclosure: NEMA 250 Type 1.
  7. Opening Speed: 12 inches per second (300 mm/s).
  8. Brake: Adjustable friction clutch type, activated by motor controller.
  9. Manual override in case of power failure.
  10. Refer to Division 26 for electrical connections.
- B. Electric Operators for doors larger than 12'x12'
1. Mounting: Side mounted.
  2. Motor Enclosure:
    - a. Exterior doors: NEMA MG 1 Type 4; open drip proof.
    - b. Interior doors: NEMA MG 1 Type 1; open drip proof.
  3. Motor Rating: 1 hp ([\_\_\_\_\_] W); continuous duty.
  4. Motor Voltage: 120 volts, single phase, 60 Hz.
  5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  6. Controller Enclosure: NEMA 250 Type 1.
  7. Opening Speed: 12 inches per second (300 mm/s).
  8. Brake: Adjustable friction clutch type, activated by motor controller.

9. Manual override in case of power failure.
10. Refer to Division 26 for electrical connections.
- C. Control Station: Standard three button (OPEN-STOP-CLOSE) constant pressure control for each operator.
  1. Surface mounted.
- D. Provide explosion proof motor enclosure and control stations at doors 117, 119, & 121.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that opening sizes, tolerances and conditions are acceptable.

#### **3.02 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. 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.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Division 26.
- F. Complete wiring from disconnect to unit components.
- G. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 079005.
- H. Install perimeter trim and closures.

#### **3.03 TOLERANCES**

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

#### **3.04 ADJUSTING**

- A. Adjust operating assemblies for smooth and noiseless operation.

**3.05 CLEANING**

- A. Clean installed components.
- B. Remove labels and visible markings.

**END OF SECTION**

**SECTION 084313 - ALUMINUM-FRAMED STOREFRONTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum doors and frames.
- B. Weatherstripping.
- C. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
- D. 2-6.1.1 - Recycled Content
  - 1. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements.
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- F. Section 088000 - Glazing: Glass and glazing accessories.
- G. Section 08 9100 - Louvers. (Storefront Contractor to supply, install, coordinate dimensions, and maintain product warranties)

**1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.

- E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- F. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic") 2002 (Ed. 2004).

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals 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.
- D. Samples: Submit two samples 12 x 12 inches (305x305 mm) in size illustrating finished aluminum surface, glass, glazing materials.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Government's name and registered with manufacturer.
- F. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
  - 2. Include statement indicating costs (sell price for each product having recycled content)
  - 3. Total weight of products provided

#### **1.05 QUALITY ASSURANCE**

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

#### **1.06 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.

### **1.07 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

### **1.08 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Beneficial Occupancy.
- C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## **PART 2 PRODUCTS**

### **2.01 BASIS OF DESIGN**

- A. Front-Style, Thermally-Broken for exterior storefront:
  - 1. Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (51 mm wide by 114 mm deep).
  - 2. Provide reinforcement of storefront frames as required per manufacturer's recommendations. Refer to Contract Documents.

### **2.02 STOREFRONT**

- 1. Glazing Rabbet: For 1 inch (25.4 mm) insulating glazing at Thermally Broken Applications
  - 2. Finish: As Selected by the Government.
    - a. Factory finish all surfaces that will be exposed in completed assemblies.
    - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
  - 3. Finish Color: As selected by the Government.
  - 4. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
- B. Performance Requirements:

- a. Design Wind Loads: Comply with requirements of ASCE 7.
2. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft (0.3 L/sec sq m) of wall area, when tested in accordance with ASTM E283 at 6.27 psf (300 Pa) pressure differential across assembly.
3. Overall U-value Including Glazing: 0.50 Btu/(hr sq ft deg F) (.146 W/(sq m K)), maximum.

### **2.03 COMPONENTS**

1. Cross-Section: As indicated on drawings.
  2. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: As specified in Section 088000.

### **2.04 MATERIALS**

- A. Sheet Aluminum: ASTM B209 (ASTM B209M).
- B. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch (0.81 mm) minimum thickness; finish to match framing members.
- C. Perimeter Sealant: Type V specified in Section 07 9005.
- D. Glass: As specified in Section 08 8000.
- E. HP (High Performance) sill, with incorporate screw spline end dams, ensuring positive engagement and tight joints between the sill flashing and end dam. Apply to all exterior applications of thermally broken systems.
- F. Recycled Content: For aluminum products: Minimum Total Recovered Materials Content - 30%

### **2.05 FINISHES**

- A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene flouride (PVDF) system
  1. Polyvinylidene flouride (PVDF) multi-coat thermoplastic flouropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 1.2 mil; color and glass as selected from manufacturer's standard line.
- B. Color: Custom color as selected by The Government.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

## **2.06 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**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

### **3.02 INSTALLATION**

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Install perimeter sealant in accordance with Section 079005.
- F. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

**3.03 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 1/16 inches per 10 ft (1.5 mm/3 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

**3.04 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Remove excess sealant by method acceptable to sealant manufacturer.

**3.05 PROTECTION**

- A. Protect installed products from damage until Date of Beneficial Occupancy.

**END OF SECTION**

SECTION 087100 - DOOR HARDWARE

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 commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Sliding doors.
  - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical door hardware.
  - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 06 Section "Rough Carpentry".
  - 2. Division 06 Section "Finish Carpentry".
  - 3. Division 08 Section "Operations and Maintenance".
  - 4. Division 08 Section "Door Schedule".
  - 5. Division 08 Section "Hollow Metal Doors and Frames".
  - 6. Division 08 Section "Flush Wood Doors".
  - 7. Division 08 Section "Blast Resistant Doors".
  - 8. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.

- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
1. ANSI/BHMA Certified Product Standards - A156 Series.
  2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
  3. ANSI/UL 294 - Access Control System Units.
  4. UL 305 - Panic Hardware.
  5. ANSI/UL 437- Key Locks.

### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    - b. Complete (risers, point-to-point) access control system block wiring diagrams.
    - c. Wiring instructions for each electronic component scheduled herein.
  2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the Government has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Government must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity.

Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Government concerning both standard and electromechanical door hardware and keying.

- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
  - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
  
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
  
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
  
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - 3. Review sequence of operation narratives for each unique access controlled opening.
  - 4. Review and finalize construction schedule and verify availability of materials.
  - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
  
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5      DELIVERY, STORAGE, AND HANDLING

- A.      Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B.      Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C.      Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Government via registered mail or overnight package service. Instructions for delivery to the Government shall be established at the "Keying Conference".

1.6      COORDINATION

- A.      Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B.      Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7      WARRANTY

- A.      General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Government of other rights Government may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B.      Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Government. Failures include, but are not limited to, the following:
  - 1.      Structural failures including excessive deflection, cracking, or breakage.
  - 2.      Faulty operation of the hardware.
  - 3.      Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4.      Electrical component defects and failures within the systems operation.
- C.      Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D.      Special Warranty Periods:
  - 1.      Ten years for mortise locks and latches.
  - 2.      Five years for exit hardware.

3. Twenty five years for manual overhead door closer bodies.
4. Five years for motorized electric latch retraction exit devices.
5. Two years for electromechanical door hardware.

#### 1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for The Government's continued adjustment, maintenance, and removal and replacement of door hardware.

### PART 2 - PRODUCTS

#### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
  1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, Government, and their designated consultants.

#### 2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
  1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

- a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
  - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
  - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
- a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

## 2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

## 2.4 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
- 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
  - 2. Furnish dust proof strikes for bottom bolts.

3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
  4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
- B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
  2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
  3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
  4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

## 2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
1. Threaded mortise cylinders with rings and cams to suit hardware application.
  2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
  4. Tubular deadlocks and other auxiliary locks.
  5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  6. Keyway: Match Facility Restricted Keyway.
- C. Interchangeable Cores: Provide small format interchangeable cores as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
  2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Government.
  3. Existing System: Field verify and key cylinders to match Government's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Two (2)

2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Government representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Government.

## 2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

## 2.7 ELECTROMECHANICAL LOCKING DEVICES

A. Electromechanical Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed, subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below and in the hardware sets.

1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.

## 2.8 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

## 2.9 ELECTROMAGNETIC LOCKING DEVICES

- A. Surface Electromagnetic Locks (Heavy Duty): Electromagnetic locks to be surface mounted type tested to ANSI A156.23, Grade 2 with minimum holding force strength of 1,200 pounds. Locks to be capable of accepting between 12 to 24 volts direct current and be UL listed for use on fire rated door assemblies. Electromagnetic coils are to consume no more than 1.5W during normal operation. Locks are to have an integrated door position switch, tamper switch, and lock bond sensor. Locks are to have integrated motion sensor and/or security camera as indicated in the hardware sets. Locks to be capable of detecting door prop conditions and entering low power mode. Provide mounting accessories as needed to suit opening conditions. Power supply to be by the same manufacturer as the lock with combined products having a lifetime replacement warranty.

## 2.10 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
  1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
  2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
  3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
  4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
  5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

#### 2.11 ELECTROMECHANICAL EXIT DEVICES

- A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.
1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
  2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
  3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.

#### 2.12 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
  2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
  4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
  6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.

## 2.13 ARCHITECTURAL TRIM

### A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
  - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

2.14      DOOR STOPS AND HOLDERS

- A.      General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B.      Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
- C.      Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

2.15      ARCHITECTURAL SEALS

- A.      General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B.      Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  - 1.      Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C.      Fire Labeled Gasketing: 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 UL-10C.
  - 1.      Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D.      Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E.      Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

2.16      ELECTRONIC ACCESSORIES

- A.      Key Switches: Key switches furnished standard with stainless steel single gang face plate with a 12/24VDC bi-color LED indicator. Integral backing bracket permits integration with any 1 1/4"

or 1 1/2" mortise type cylinder. Key switches available as momentary or maintained action and in narrow face plate options.

- B. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.
- C. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
- D. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.
  - 1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

## 2.17 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.18 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide 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 specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

**PART 3 - EXECUTION**

**3.1      EXAMINATION**

- A. Examine scheduled openings, 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. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

**3.2      PREPARATION**

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

**3.3      INSTALLATION**

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

#### 3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures" and "Cash Allowances". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

#### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

#### 3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Government occupancy.

#### 3.7 DEMONSTRATION

- A. Instruct Government's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

#### 3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the Government and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a

hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

**Hardware Sets**

**Set: 1.0**

Doors: [D102](#)

Description: EXT SHOP - EAC

3 Hinge (heavy weight)	T4A3386 NRP 4-1/2" x 4-1/2"	US32D MK
1 Rim Exit Device, Classroom	7100 B MELR JN626F	630 YA ⚡
1 Cylinder	SFIC as required	626 BE
1 Surface Closer	CLP8501 TBGN	690 NO
1 Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D RO
1 Threshold	271A	PE
1 Gasketing	S88D	PE
1 Rain Guard	346C x LAR	PE
1 Sweep	315CN	PE
1 ElectroLynx Harness	QC-C1500 [ PS to hinge ]	MK ⚡
1 ElectroLynx Harness	QC-CXXP [ Lock / exit to hinge ]	MK ⚡
1 Electric Power Transfer	By security contractor	SU ⚡
1 Card Reader	By security contractor	⚡
1 Power Supply	AQLX-E1 - Size as required	SU ⚡

**Set: 2**

Doors: [D104](#)

Description: STORAGE - EGRESS

3 Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D MK
1 Exit Device (rim, nightlatch)	7100 JN627F SN-134	630 YA
1 Cylinder	SFIC as required	626 BE
1 Surface Closer	8501 TBGN	689 NO
1 Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D RO
1 Door Stop	409 / 446	US32D RO
1 Threshold	271A	PE
1 Gasketing	S88D	PE
1 Sweep	315CN	PE

**Set: 3**

Doors: D105

Description: EXT-CORR - EAC

3 Hinge (heavy weight)	T4A3386 NRP 4-1/2" x 4-1/2"	US32D MK
1 Rim Exit Device, Classroom	7100 B MELR JN626F	630 YA ⚡
1 Cylinder	SFIC as required	626 BE
1 Surface Closer	CLP8501 TBGN	689 NO
1 Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D RO
1 Threshold	271A	PE
1 Gasketing	S88D	PE
1 Rain Guard	346C x LAR	PE
1 Sweep	315CN	PE
1 ElectroLynx Harness	QC-C1500 [ PS to hinge ]	MK ⚡
1 ElectroLynx Harness	QC-CXXP [ Lock / exit to hinge ]	MK ⚡
1 Electric Power Transfer	By security contractor	SU ⚡
1 Card Reader	By security contractor	⚡
1 Position Switch	By security contractor	SU ⚡
1 Power Supply	AQLX-E1 - Size as required	SU ⚡

**Set: 4**

Doors: D101

Description: OH DOOR

1 Hardware	by mfg
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**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Glass.
- B. Glazing compounds and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 079005 - Joint Sealers: Sealant and back-up material.
- B. Section 08 4413 - Glazed Aluminum Curtain Walls.
- C. Section 08 4313 - Aluminum-Framed Storefronts.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ASTM C1036 - Standard Specification for Flat Glass 2021.
- C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- D. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass 2019.
- E. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- F. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2010.
- G. GANA (GM) - GANA Glazing Manual 2008.
- H. GANA (SM) - GANA Sealant Manual 2008.
- I. GANA (LGRM) - Laminated Glazing Reference Manual 2009.
- J. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).
- K. ASTM Standard F1642-04, Standard Test Method for Glazing and Glazing Systems subject to airblast loadings.
- L. UFC 4-010-01 DpD Minimum Antiterrorism Standards for Buildings.

**1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.

- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Samples: Submit two samples 12x12 inch (305 x 305 mm) in size of glass and plastic units, showing coloration and design.

### **1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

### **1.06 MOCK-UP**

- A. See section 08 4413 - Glazed Aluminum Curtain Walls.

### **1.07 WARRANTY**

- A. See Section 017800 - 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 ten (10) year warranty to include coverage for delamination, including replacement of failed units.

## **PART 2 PRODUCTS**

### **2.01 INSULATING GLASS UNITS**

- A. Type IG-1 - Not used.
- B. Ttype IG-2 - Not used.
- C. Type [IG-3] - Solar Control, Laminated Insulating Glass Units: Vision glass, double glazed.
  - 1. Application: All exterior glazing unless otherwise indicated.
  - 2. Performance Requirements:
    - a. Winter U-Value: 028
    - b. Solar Heat Gain Coefficient: 0.20
    - c. VLT (%): 33
  - 3. Outdoor Lite:
    - a. Glass Thickness: (1/4") 6 mm, minimum type as required for blast resistance requirements.

- b. Tint & Coating: Gray tent with triple silver, magnetron sputter vacuum deposition (MSVD) coating capable of achieving listed performance criteria
  - c. Heat-Treatment: Tempered and Heat Strengthened as mandated for safety and by code.
- 4. Interspace Content: Air (1/2") 12.7 mm
  - 5. Inboard Lite: Annealed float glass, 1/4" thick, minimum, tempered.
    - a. Outboard Lite:
      - 1) Tint: Clear (non-coated)
      - 2) Heat-Treatment: Tempered and Heat Strengthened as mandated for safety and by code.

## **2.02 GLAZING UNITS**

### **A. Type S-1 - Single Vision Glazing:**

- 1. Application: All interior glazing unless otherwise indicated.
- 2. Type: Fully tempered float glass.
- 3. Tint: Clear.
- 4. Thickness: 1/4 inch (6 mm).
- 5. Polish all exposed edges.

## **2.03 GLASS MATERIALS**

### **A. 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.

## **2.04 GLAZING ACCESSORIES**

- ### **A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of**

- glazing or minimum 4 inch (100 mm) x width of glazing rabbet space minus 1/16 inch (1.5 mm) 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 II. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
  - C. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I.
  - D. Glazing Clips: Manufacturer's standard type.

### **PART 3 EXECUTION**

#### **3.01 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.

#### **3.02 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 manufacturer's instructions.

#### **3.03 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)**

- A. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) 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.

#### **3.04 INSTALLATION - PLASTIC FILM**

- A. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.
- B. Place without air bubbles, creases or visible distortion.
- C. Fit tight to glass perimeter with razor cut edge.

**3.05 CLEANING**

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

**3.06 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.

**END OF SECTION**

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**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Louvers, frames, and accessories.
- B. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-6.1.1 - Recycled Content
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 076200 - Sheet Metal Flashing and Trim.
- F. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- G. Section 084313 - Aluminum-Framed Storefronts: Prepared openings for louvers.
- H. Section 099113 - Exterior Painting: Field painting.
- I. Section 230913 - Instrumentation and Control Devices for HVAC: Actuators for operable louvers.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- C. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating 2015.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

2020.

- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- F. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- G. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, 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 (50 by 50 mm) in size illustrating finish and color of exterior and interior surfaces.
- E. Test Reports: Independent agency reports showing compliance with specified performance criteria.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Maintenance Data: Include lubrication schedules and adjustment requirements .
- H. Sustainability Submittals, Product data for HPSB Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Total weight of products provided

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

### **1.06 WARRANTY**

- A. See Section 017800 - 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.

### **1.07 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content:
  - 1. See Part 2 of this specification section for specific recycled content thresholds, if applicable.

## **PART 2 PRODUCTS**

### **2.01 LOUVERS**

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511, meeting AMCA 550.
  - 1. Wind Load Resistance: Design to resist positive and negative wind load 100 psf without damage or permanent deformation.
  - 2. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft (3.1 g/sq m) water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
  - 3. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
- B. Stationary Louvers: Vertical blade, extruded aluminum construction, with intermediate mullions matching frame.
  - 1. Free Area: 50 percent, minimum.
  - 2. Blades: 7/8" spaced.
  - 3. Frame: 3 inches deep (76 mm deep), channel profile; corner joints mitered and, with continuous recessed caulking channel each side.
  - 4. Aluminum Thickness: Frame 12 gage, 0.0808 inch (2.05 mm) minimum; blades 16 gage, 16 inch (1.291 mm) minimum.

## **2.02 MATERIALS**

- A. Extruded Aluminium: ASTM B221 (ASTM B221M)
- B. Insect Screen: 18 x 16 size aluminum mesh.
- C. Recycled Content: For aluminum products: Minimum Total Recovered Materials Content - 30%

## **2.03 FINISHES**

- A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
- B. Color: As selected by the Contracting Officer from the manufacturer's full range of colors.

## **2.04 ACCESSORIES**

- A. Blank-Off Panels: Insulated Sandwich Panel, same material as louver with 1/2" extruded polystyrene core, painted to match louver finish on exterior side; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.
- B. Fasteners and Anchors: Galvanized steel.
- C. Head and Sill Flashings: See Section 076200.
- D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.
- E. Sealant: as specified in Section 07 9005.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.
- B. Verify that field measurements are as indicated.

### **3.02 INSTALLATION**

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Coordinate with installation of flashings by others.
- C. Install louvers level and plumb.

- D. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- E. Secure louver frames in openings with concealed fasteners.
- F. Install perimeter sealant and backing rod in accordance with Section 079005.
- G. Coordinate with installation of mechanical ductwork.

### **3.03 CLEANING**

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

**END OF SECTION**

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**SECTION 090561 - COMMON WORK RESULTS FOR FLOORING PREPARATION**

**PART 1 GENERAL**

- A. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:
  - 1. Sealed Concrete
  - 2. All other floor finishes as specified in individual sections.
- B. Preparation of new concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for moisture and alkalinity (pH).
- D. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
  - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

**1.02 RELATED REQUIREMENTS**

- A. Section 014000 - Quality Requirements: Additional requirements relating to testing agencies and testing.
- B. Section 09 9123 - Interior Painting (Sealing Concrete Floors)

**1.03 REFERENCE STANDARDS**

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

**1.05 SUBMITTALS**

- A. Testing Agency's Report:
  - 1. Description of areas tested; include floor plans and photographs if helpful.

2. Summary of conditions encountered.
3. Copies of specified test methods.
4. Recommendations for remediation of unsatisfactory surfaces.
5. Submit report to The Government.
6. Submit report not more than two business days after conclusion of testing.

### **1.06 QUALITY ASSURANCE**

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
  1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- C. Contractor's Responsibility Relating to Independent Agency Testing:
  1. Provide access for and cooperate with testing agency.
  2. Confirm date of start of testing at least 10 days prior to actual start.
  3. Allow at least 4 business days on site for testing agency activities.
  4. Achieve and maintain specified ambient conditions.
  5. Notify The Government when specified ambient conditions have been achieved and when testing will start.

### **1.07 FIELD CONDITIONS**

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F (18 degrees C) or more than 85 degrees F (30 degrees C).
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

## **PART 2 PRODUCTS**

## **PART 3 EXECUTION**

### **3.01 CONCRETE SLAB PREPARATION**

- A. PROPER SURFACE PREPARATION INCLUDES THE FOLLOWING:
  1. Inspection of the existing concrete substrate

2. Removal of existing floor coatings
3. Decontamination of the concrete surface
4. Creation of surface profile
5. Repair of surface irregularities

**B. REMOVAL OF EXISTING FLOOR FINISH**

1. Removal of existing flooring finish down to existing concrete substrate must be accomplished prior to installation of the new flooring system. Localized weak or deteriorated concrete must be removed to sound concrete and replaced with materials recommended by the flooring system manufacturer. When bonding fresh concrete to existing, prepare the existing concrete surface by scabbling, scarifying, abrasive (sand) blasting, needle scaling, high pressure water jetting, or steel shot blasting. Refer to flooring system manufacturer's recommendations for additional guidance.

**C. DECONTAMINATION OF THE CONCRETE SURFACE**

1. Decontamination of the concrete surface requires the removal of oils, grease, wax, fatty acids and other contaminants, and may be accomplished by the use of detergent scrubbing with a heavy duty cleaner/degreaser, low pressure water cleaning (less than 5,000 psi), steam cleaning, or chemical cleaning. The success of these methods is dependent upon the depth of penetration of the contaminant; which is completely dependent upon the contaminant's viscosity, the concrete's permeability and the duration of exposure. Special care should be taken when preparing concrete at an "in use" facility for repair, replacement or an initial floor topping.
2. Test concrete substrate for moisture vapor emission using test methods recommended by manufacturer of flooring system being installed.

**D. CREATION OF SURFACE PROFILE**

1. Creation of surface profile can be accomplished by a number of methods each utilizing a selection of tools, equipment and materials to accomplish the intended purpose, (See METHODS OF SURFACE PREPARATION below). Selection is dependent upon the type of surface to be prepared and the type of system to be installed. In addition, floors, trenches each have their own particular requirements. The type and thickness of the selected flooring system also plays an important role in the selection process. Regardless of the method selected or tools employed, the contractor must provide a surface that will accept the application of flooring products and allow the mechanical bond of the flooring system securely to the concrete. The type of service the structure will be subjected to, will also help to define the degree of profile required. The surface profile is the measure of the average distance from the peaks of the surface to the valleys as seen through a cross sectional view of the surface of

the concrete.

2. This dimension is defined pictorially and through physical samples in the ICRI Technical Guideline No 03732, and is expressed as a Concrete Surface Profile number (CSP 1-9).
3. Methods of Surface Preparation
  - a. Depending upon conditions of the concrete one or more methods of surface preparation may be required. It is common for decontamination to precede mechanical preparation, and if necessary a second decontamination to follow.
  - b. The preferred methods for creation of a surface profile, including the removal of dirt, dust, laitance and curing compounds, is steel shotblasting, abrasive (sand) blasting or scarifying. The steel shotblasting or vacuum blasting process is commonly referenced by equipment brand names, such as, Blastrac, Vacu-Blast, Shot-Blast, etc. Vertical and overhead surfaces, such as cove base, wall, and ceiling surfaces shall be prepared utilizing methods of grinding, scarifying, abrasive (sand) blasting, needle scaling, or vertical steel shotblasting. The following table provides a guide for the degree of surface profile required for the coating or overlay to be applied and the preparation methods used to generate each profile. Provide written instruction from manufacturer to the Government regarding profile requirements and recommended method for achieving profile.

<b>Application</b>	<b>Profile</b>	<b>Preparation</b>
Sealers	0-3 mils	Detergent scrub Low-pressure Water Acid Etching (not recommended) Grinding
Thin Film	4-10 mils	Grinding Abrasive Blast Steel Shot Blast
High Build	10-40 mils	Abrasive Blast Steel Shot Blast Scarifying
Self-Leveling	50 mils-1/8 inch	Abrasive Blast Steel Shot Blast Scarifying Needle Scaling
Polymer Overlay	1/8-1/4 inch	Abrasive Blast Steel Shot Blast Scarifying Needle Scaling Scabbling Flame Blasting Milling/rotomilling

4. Other surface preparation methods are mentioned in ADDITIONAL SURFACE PREPARATION REFERENCES.

**E. REPAIR OF SURFACE IRREGULARITIES**

1. Repair of surface irregularities including bugholes, spalls, cracks, deteriorated joints, slopes, areas near transition zones, such as around drains, floor boxes, doorways, etc. must be repaired prior to the placement of the flooring system and/or the system must be designed to off-set the thickness of the irregularities. For bugholes and other minor surface irregularities, fill using materials recommended by manufacturer of flooring system. For treatment of cracks and joints refer to the section below entitled “Crack Isolation”.

#### **F. CRACK ISOLATION**

1. The performance of elastomeric products, requires a relatively uniform dry film thickness to resist drying shrinkage and thermal movement of the concrete, while maintaining a seamless bridge or seal over the concrete. Therefore it is critical that all mortar splatter, protrusions, ridges, penetrations, or sharp projections in the surface of the concrete, be ground smooth or otherwise made smooth, in addition to the normal surface preparation outlined above.
2. Prior to application of an elastomeric system, control/contraction joints, construction joints, and cracks should be sealed with the selected system flexible sealant as recommended by manufacturer of flooring system. This coating should extend a minimum of 6” on either side of the joint or crack. The entire surface area should then receive the specified crack isolation system. Isolation and/or expansion joints should be detailed in accordance with the floor system manufacturer’s recommendations.
3. General Polymer systems can be applied to a variety of substrates if the substrate is properly prepared. Preparation of surfaces other than concrete or steel, such as wood, concrete block, brick, quarry tile, glazed tile, cement terrazzo, vinyl composition tile, plastics and existing polymer systems, can be accomplished to receive bonded polymer sealers, coatings, or toppings. For questions regarding a substrate other than concrete or steel, or a condition not mentioned in this guideline, contact the product Technical Service Department prior to starting the project. For steel surfaces, refer to Guideline Instructions for Surface Preparation of Structural Steel, Form G-2. Repair of surface irregularities including bugholes, spalls, cracks, deteriorated joints, slopes, areas near transition zones, such as around drains, floor boxes, doorways, etc. must be repaired prior to the placement of the flooring system and/or the system must be designed to off-set the thickness of the irregularities.

#### **G. ADDITIONAL SURFACE PREPARATION REFERENCES**

1. Important and relevant information on surface preparation of concrete is available by referencing the following codes, standards, and guidelines.
  - a. SSPC The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburgh, Pa. 15222-4643, (412) 281-2331.
    - 1) SSPC-SP 13 Surface Preparation of Concrete

- 2) SSPC-TU 2/NACE 6G197 Design, Installation, and Maintenance of Coating Systems for Concrete Used in Secondary Containment
- b. ICRI International Concrete Repair Institute, 38800 Country Club Drive Farmington Hills, MI 48331, (248) 848-3809
- c. Technical Guideline No.03732, “Selecting and Specifying Concrete Surface
  - 1) Preparation for Sealers, Coatings, and Polymer Overlays”. Includes visual standards to act as a guide in defining acceptable surface profiles for the application of industrial coatings and polymer floor toppings.
  - 2) Technical Guideline No.03730, “Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion”.
- d. ASTM American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, (610) 832-9585
  - 1) ASTM D 4258 “Practice for Surface Cleaning Concrete for Coating”
  - 2) ASTM D 4260 “Standard Practice for Acid Etching Concrete”
  - 3) ASTM D 4261 “Practice for Surface Cleaning Unit Masonry for Coating”
  - 4) ASTM D 4262 “Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces”The performance of elastomeric products, requires a relatively uniform dry film thickness to resist drying shrinkage and thermal movement of the concrete, while maintaining a seamless bridge or seal over the concrete. Therefore it is critical that all mortar splatter, protrusions, ridges, penetrations, or sharp projections in the surface of the concrete, be ground smooth or otherwise made smooth, in addition to the normal surface preparation outlined above.

### **3.02 PRELIMINARY CLEANING**

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

**3.03 MOISTURE VAPOR EMISSION TESTING**

**3.04 INTERNAL RELATIVE HUMIDITY TESTING**

**3.05 ALKALINITY TESTING**

- A. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
- B. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
- C. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch (25 mm) in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.

**END OF SECTION**

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**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient base.
- B. Installation accessories.
- C. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - 1. 2-5.3.2 - Reduce Volatile Organic Compounds (VOC) Low-Emitting Materials
  - 2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 01 7419 - Construction Waste Management and Disposa
- E. Section 016116 - Colatile Organic Compound (VOC) Content Restrictions.
- F. Section 033000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.
- G. Section 090561 - Common Work Results for Flooring Preparation: Independent agency testing of concrete slabs, removal of existing floor coverings, cleaning, and preparation.

**1.03 REFERENCE STANDARDS**

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- C. ASTM F1861 - Standard Specification for Resilient Wall Base 2021.
- D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2019.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, 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 The Government's initial selection.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- E. Maintenance Materials: Furnish the following for Government's use in maintenance of project.
  - 1. Extra Wall Base: 50 linear feet (15.24 linear meters) of each type and color.
- F. **QUALITY ASSURANCE**
  - 1. Installer must be licensed, insured and have three years documented experience.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).
- B. Protect roll materials from damage by storing on end.

#### **1.06 FIELD CONDITIONS**

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

#### **1.07 WARRANTY**

- A. Provide manufacturer's limited commercial warranty.

### **PART 2 PRODUCTS**

#### **2.01 RESILIENT BASE**

- A. Resilient Base: 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, NFPA 253, ASTM E 648, or NFPA 253.
  - 2. Height: 4 inch (100 mm)

3. Thickness: 1/8" inch (3 mm) thick.
4. Finish: Satin.
5. Length: Roll.
6. Color: As indicated on drawings.
7. Accessories: Premolded external corners, internal corners, and end stops.

## **2.02 ACCESSORIES**

- A. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer to suit floor tile and substrate conditions on site.
  1. Comply with VOC restrictions specified in 01 6116
- B. Moldings, Transition and Edge Strips: as indicated on the drawings..
- C. Sealer and Wax: Types recommended by flooring manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

### **3.02 INSTALLATION**

- A. Starting installation constitutes acceptance of sub-surface conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints and butt seams tightly.

### **3.03 RESILIENT BASE**

- A. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- B. Install base on solid backing. Bond tightly to wall and floor surfaces.
- C. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

- D. Scribe and fit to door frames and other interruptions.
- E. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- F. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned. Fit joints tightly and make vertical.
- G. Install premolded corners before installing straight pieces.
- H. Job-Formed Corners:
  - 1. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

### **3.04 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

### **3.05 PROTECTION**

- A. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove wet adhesive and other blemishes from exposed surfaces with a damp cloth.

### **END OF SECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
  - 1. Exposed surfaces of steel lintels and ledge angles.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - 5. Non-metallic roofing and flashing.
  - 6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
  - 7. Marble, granite, slate, and other natural stones.
  - 8. Floors, unless specifically indicated.
  - 9. Ceramic and other types of tiles.
  - 10. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
  - 11. Glass.
  - 12. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 055000 - Metal Fabrications: Shop-primed items.
- C. Section 099123 - Interior Painting.

### **1.03 DEFINITIONS**

- A. Comply with ASTM D16 for interpretation of terms used in this section.

### **1.04 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.
- C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.
- D. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1 2016.
- E. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).

### **1.05 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
  - 4. Manufacturer's installation instructions.
  - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, discuss sheen options with the Contracting Officer Representative before preparing samples, to eliminate sheens definitely not required.
  - 3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Government's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

#### **1.07 MOCK-UP**

- A. See Section 014000 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 10 feet (3 m) long by 10 feet (3 m) wide, illustrating paint color, texture, and finish.
- C. Provide door and frame assembly illustrating paint color, texture, and finish.
- D. Locate where directed by the Government.
- E. Mock-up may remain as part of the work.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as

required by manufacturer's instructions.

### **1.09 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Primer Sealers: Same manufacturer as top coats.

### **2.02 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
  - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
  - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 016116.
- C. Flammability: Comply with applicable code for surface burning characteristics.

- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by the The Government from the manufacturer's full line.
- E. Colors: As indicated on drawings.

### **2.03 PAINT SYSTEMS - EXTERIOR**

- A. Paint CE-OP-3L - Masonry (CMU), Opaque, Latex, 3 Coat:
  - 1. One coat of block filler; MPI #4: 16.0-21.0 mils wet; 8.0-10.5 dft., 50+/- 2% volume solids, <50 g/l VOC, passes Wind Driven Rain test method TT-C-555b
  - 2. Semi-gloss: Two coats of latex enamel; MPI #11: 4.0 mils wet; 1.6 mils dft., 39 +/- 2% volume solids, <50 g/l VOC
- B. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
  - 1. One coat of alkyd primer; MPI #79: 6.0-8.0 mils wet; 3.3-4.4 mils dft, 55 +/- 2% volume solids, <390 g/l VOC
  - 2. Gloss: Two coats of alkyd enamel; MPI#9: 4.0-6.0 mils wet, 1.9-5.0 mils dft, 63 +/- 2% volumes solids, < 420 g/l VOC
- C. Paint MgE-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
  - 1. One coat galvanize primer
  - 2. Gloss: Two coats of alkyd enamel; equal to SW B54W00151 Industrial Urethane Alkyd Enamel .
  - 3. Gloss: Two coats of alkyd enamel;
    - a. MPI #79: 6.0-8.0 mils wet; 3.3-4.4 mils dft, 55 +/- 2% volume solids, <390 g/l VOC
    - b. MPI #76: 3.0-8.0 mils wet; 1.9-5.0 mils dft, 63 +/- 2% volume solids, <320 g/l VOC

### **2.04 PRIMERS**

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
  - 1. Concrete Masonry: Interior/Exterior Latex Block Filler.
  - 2. Steel, Uncoated: Anti-Corrosive Alkyd Primer for Metal.
  - 3. Steel --Shop Primer: Interior/Exterior Quick Dry Alkyd Primer for Metal.
  - 4. Galvanized Steel: Water Based Primer for Galvanized Metal.
  - 5. Aluminum: Interior/Exterior Quick Dry Primer for Aluminum.

6. Wood: Latex Primer for Exterior Wood.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Commencement of paint operations indicates applicators acceptance of surfaces and conditions.
- C. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- E. Test shop-applied primer for compatibility with subsequent cover materials.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- H. Copper: Remove contamination by steam, high pressure water, or solvent washing.
- I. Galvanized Surfaces:
  1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. Ferrous Metal:
  1. Solvent clean according to SSPC-SP 1.

2. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

### **3.03 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection.

### **3.05 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.06 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Beneficial Occupancy.

### **END OF SECTION**

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**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
  - 1. Elevator pit ladders.
  - 2. Surfaces inside cabinets.
  - 3. Prime surfaces to receive wall coverings.
  - 4. Mechanical and Electrical:
    - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
    - b. In finished areas, paint shop-primed items.
    - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
  - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
  - 6. Marble, granite, slate, and other natural stones.
  - 7. Floors, unless specifically indicated.
  - 8. Ceramic and other tiles.

9. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
10. Exterior insulation and finish system (EIFS).
11. Electrical devices and plates.
12. Door hardware and cabinet hardware.
13. Glass.
14. Toilet accessories and toilet partitions.
15. Concrete masonry units in utility, mechanical, and electrical spaces.
16. Acoustical materials, unless specifically indicated.
17. Concealed pipes, ducts, and conduits.
18. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  - a. 2-5.3.2 - Reduce Volatile Organic Compounds (VOC) Low-Emitting Materials
  - b. 2-6.1.2 - Biologically Based Products
  - c. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.
- E. Materials included in this section shall meet the requirements for High Performance Sustainable Buildings for New Construction points for the following Sections:
  1. 2-5.3.2 - Reduce Volatile Organic Compounds (VOC) Low-Emitting Materials
  2. The contractor is expected to understand the HPSB requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.

## **1.02 RELATED REQUIREMENTS**

- A. Section 01 3325 - Project Sustainability Summary
- B. Section 01 3329 - Sustainable Design Reporting
- C. Section 01 6000 - Product Requirements
- D. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- E. Section 01 7419 - Construction Waste Management and Disposal
- F. Section 055000 - Metal Fabrications: Shop-primed items.

- G. Section 055100 - Metal Stairs: Shop-primed items.
- H. Section 08 1113 - Hollow Metal Doors and Frames
- I. Section 099113 - Exterior Painting.

### **1.03 DEFINITIONS**

- A. Comply with ASTM D16 for interpretation of terms used in this section.

### **1.04 REFERENCE STANDARDS**

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.
- B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.
- C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
- E. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).

### **1.05 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
  - 3. Manufacturer's installation instructions.
  - 4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, discuss sheen options with Contracting Officer Representative before preparing samples, to eliminate sheens definitely not

required.

3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Sustainability Submittals, Product data for HPSB Compliance:
1. For products containing VOCs, documentation (material safety data sheets (MSDS), third-party certificates, or test reports) showing printed statement of VOC content.
  2. VOC Content Limitations: For the specified products, submit documentation of conformance with Specification Section 01 6116 – Volatile Organic Compound (VOC) Content Restrictions.
- G. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- H. Maintenance Materials: Furnish the following for the Government's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.
  2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
- I. Label each container with color in addition to the manufacturer's label.
- J. Sustainability Submittals, Product data for HPSB Compliance:
1. For products containing VOCs, documentation (material safety data sheets (MSDS), third-party certificates, or test reports) showing printed statement of VOC content.
- K. VOC Content Limitations: For the specified products, submit documentation of conformance with Specification Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

## **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

### **1.07 MOCK-UP**

- A. See Section 014000 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 10 feet (3 m) long by 10 feet (3 m) wide, illustrating paint color, texture, and finish.
- C. Provide door and frame assembly illustrating paint color, texture, and finish.
- D. Locate where directed by the Government.
- E. Mock-up may remain as part of the work.

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

### **1.09 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

### **1.10 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with the lowest possible VOC content.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions. Paint Manufacturer must be listed as an MPI approved company.
- B. Primer Sealers: Same manufacturer as top coats.
- C. Block Fillers: Same manufacturer as top coats.
- D. Substitutions: See Section 016000 - Product Requirements.

**2.02 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
  - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
  - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 016116.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by the The Government from the manufacturer's full line.
- E. Colors: As indicated on drawings.
  - 1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under or as indicated on drawings.

**2.03 PAINT SYSTEMS - INTERIOR**

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, wood, plaster, uncoated steel, and shop primed steel.
  - 1. Two top coats and one coat primer.

2. Top Coat Sheen:
    - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
    - b. Eggshell: MPI gloss level 3; use this sheen at all locations.
    - c. Satin: MPI gloss level 4; use this sheen for items subject to frequent touching by occupants, including door frames and railings.
    - d. Semi-Gloss: MPI gloss level 5; use this sheen at opaque wood and metal..
  3. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint I-OP-DF - Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.**
1. Shop primer as recommended by manufacturer of top coat.
  2. Finish:
    - a. MPI #118, Flat (<50 g/l voc) (25%+ volume solids)
    - b. MPI #155, EgShel (<50 g/l voc) (33%+ volume solids)
- C. Paint I-TR-C - Transparent Finish on Concrete Floors.**
1. 2 coats sealer.
  2. Sealer: Water Based for Concrete Floors.
    - a. Products:
      - 1) MPI #31 (<300 g/l voc) (68% +/- 2% volume solids) (passed ASTM D4060)
      - 2) or MPI #83 (<300 g/l voc) (68% +/- 2% volume solids) (passed ASTM D4060)
      - 3) Provide 2 coats installed in strict accordance of manufacturer.
      - 4) Test in accordance with ASTM F710 prior to installation to verify compliceance with manufacturer.
      - 5) Provide surface preparation and application per manufacturer's recommendations.
- D. Paint CI-OP-3L - Concrete/Masonry, Opaque, Latex, 3 Coat:**
1. One coat of block filler: (16.0 - 21.0 mils wet; 8.0 – 10.5 mils dry)
    - a. MPI #4 – CMU (<50 g/l voc) (50% +/- 2% volume solids)

2. One coat of masonry primer (5.0 - 12.0 mils wet; 2.1 – 5.1 mils dry)
    - a. MPI #3 – Smooth Masonry (50 g/l voc) (43% +/- 2% volume solids)
  3. Semi-gloss: Two coats of latex enamel:
    - a. MPI #141 or MPI #141X (<50 g/l voc) ( 35% +/- 2% volume solids) (pass scrub resistance test: ASTM D2486)
- E. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
1. One coat of latex primer
    - a. MPI #107, MPI #107X, MPI #134 (50 g/l voc) (38% +/- 2%) (5.0 – 10.0 mils wet)
  2. Semi-gloss: Two coats of latex enamel:
    - a. MPI #140, MPI #140X (<50 g/l voc) (35% +/- 2%) (6.0 – 12.0 mils wet)
- F. Paint MgI-OP-3L - Galvanized Metals, Latex, 3 Coat:
1. One coat galvanize primer:
    - a. MPI #107. MPI #107X, MPI #134 (50 g/l voc) (38% +/- 2%) (5.0 – 10.0 mils wet)
  2. Gloss: Two coats of latex enamel:
    - a. MPI #148, MPI #148X (<50% +/- 2%) (6.0 – 12.0 mils wet)

## **2.04 PRIMERS**

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats. Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
1. Concrete/Plaster: Interior Institutional Low Odor/VOC Primer Sealer; MPI #149.
  2. Concrete Masonry: Interior/Exterior Latex Block Filler; MPI #4.
  3. Gypsum Board/Plaster: Interior Latex Primer Sealer; MPI #50.
  4. Steel: Anti-Corrosive Alkyd Primer for Metal; MPI #79.
  5. Steel --Shop Primer: Interior/Exterior Quick Dry Alkyd Primer for Metal; MPI #76.
  6. Galvanized Steel: Interior Water Based Primer for Galvanized Metal; MPI #134.
  7. Aluminum: Interior/Exterior Quick Dry Primer for Aluminum; MPI #95.

8. Wood: Latex Primer for Interior Wood; MPI #39.

## **2.05 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Commencement of paint operations indicates applicators acceptance of surfaces and conditions.
- C. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  1. Gypsum Wallboard: 12 percent.
  2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
  3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  4. Concrete Floors and Traffic Surfaces: 8 percent.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.

- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
  - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  - 2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
  - 3. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
  - 4. Prepare surface as recommended by top coat manufacturer.
- G. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. Copper: Remove contamination by steam, high pressure water, or solvent washing.
  - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- K. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- L. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- M. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.

- N. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with tinted primer.
- O. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.03 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- K. At SAPF and SAPCA walls (refer to drawings for location(s)) the contractor shall finish and paint walls from concrete to underside of metal roof decking including areas concealed below raised flooring systems and above acoustical ceilings.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection.

### **3.05 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.06 PROTECTION**

- A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Beneficial Occupancy.

**END OF SECTION**