

**Volume I Specifications**  
for the  
**A New Security Building**  
at  
**Birmingham IAP (ANG)**

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Birmingham, Alabama



**Type B3 (100%) Submittal – Volume I**

**Date:** June 2024

**Job No:** 12072/BRKR 009063

**Set No:**

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## **SECTION 000102 - PROJECT INFORMATION AND SUMMARY**

### **PART 1 GENERAL**

#### **1.01 PROJECT IDENTIFICATION**

- A. Project Name: A New Security & Services Training Facility, 117th Air Refueling Wing, Birmingham IAP, Birmingham, AL.
- B. Government Project #BRKR009063
- C. Project Number: Architect's Project #12072
- D. The Owner, hereinafter referred to as the Government: Alabama Air National Guard.
- E. Government's Representatives & Titles:
  - 1. Contracting Officer (KO): Mr. William Kast
  - 2. Contracting Specialist: CMSgt. William Hall
  - 3. Contracting Officer Representative (COR) : Major Jeff Farmer, Base Civil Engineer

#### **1.02 CONTRACT DURATION**

- A. The Contract Duration shall be 395 calendar days from notice to proceed to final completion. This is inclusive of approximately 30 calendar days for completion of punch list activities following beneficial occupancy, preparation of as-built documents, and submission/approval of all project closeout documentation. The Contractor will be responsible for coordinating punch list activities around the Government's activities following beneficial occupancy.

#### **1.03 PROJECT DESCRIPTION**

- A. Project scope includes a new facility for the 117th security forces squadron. The proposed project includes, but is not limited to, the following scopes of work as is indicated on the Contract Documents:
  - 1. Demolition:
    - a. In preparation of new building construction, the project site-work includes, but is not limited to; demolition of existing underground and overhead site utilities, demolition of buildings 205 and 214, and demolition of existing concrete pavement, curbs, gutters and sidewalks.
  - 2. Construction:

- a. A new 9,941 (approximate) square foot facility consisting of, but not limited to, the following:
  - 1) Concrete slab on grade construction including building undercut / pad preparation as indicated on the drawings.
  - 2) Load bearing CMU walls supporting premanufactured light gauge steel trusses, metal roof decking, and standing seam metal roof systems.
  - 3) The facility is clad in clay masonry and cast stone matching adjacent base facilities.
  - 4) Steel reinforced aluminum curtain wall window systems meeting the anti-terrorism/force protection requirements of UFC 4-010-01.
  - 5) A mechanical platform consisting of concrete floor over metal decking supported by open web steel joists.
  - 6) Interior painted CMU and gypsum board wall assemblies.
  - 7) Interior finishes include:
    - (a) Painted concrete masonry unit (CMU) walls.
    - (b) Carpet and vinyl tile over concrete slabs
    - (c) Sealed concrete floors
    - (d) Acoustical tile ceilings.
    - (e) Hard tile floors and walls in restroom areas.
    - (f) Plastic laminate faced casework with quartz countertops.
  - 8) Air cooled chillers serving constant volume air handlers with electric heat serving variable air volume terminal boxes.
  - 9) Pre-action type wet pipe sprinklers to be provided from the existing underground base wide water distribution system.
  - 10) Underground electrical service to be served from a nearby ground mounted switch.
  - 11) Project will include installation of telecommunications infrastructure and cabling to support unclassified communications systems network. Fiberoptic service will be provided from the nearby Communications Building 190 as part of the project.

- 12) Re-routing of existing utility infrastructure as required to support the proposed construction including domestic water, fire protection water service, power, telecommunications, sanitary sewer, and storm drainage systems.

**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. Intrusion Detection System (IDS):**

1. Controlled areas are designed to be equipped with Intrusion Detection System.
2. The IDS system must be fully compatible with the existing USAF approved Advantor IDS Annunciator located in the 117th SFS BDOC.
3. Included in the scope of work, ADVANTOR shall relocate and reconfigure the existing Base Defense Operations Center (BDOC) infrastructure into the new BDOC with the proposed facility.
4. 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, systems per Advantor Systems Corporation's "Proposal" solicited by the Government.
5. 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 systems as defined by Advantor System Corporation.
6. Contractor shall contact the project Contracting Officer regarding FAR Part 51 Authorization of Contractor's procurement of Advantor Systems Corporation materials, equipment and services.

**D. Sustainability Design and Energy Conservation:**

1. The project design incorporates Sustainability Concepts to achieve optimum resource efficiency, constructability, sustainability, and energy conservation.
2. The project has been designed in accordance with the provisions of the Leadership in Energy and Environmental Design (LEED) program, version 2009.

3. The project has been registered with the USGBC / LEED and is intended to go through Construction Certification. The Design Goal is LEED Silver.
4. The Contractor will be responsible for compiling all information and submitting, via the LEED Online portal, all information required under "Construction Submittals" as required to certify the project upon completion of the work. The Design Team will document and submit all "Design Submittals." The project will submit two submittals to USGBC / LEED for review and approval. The design team will submit a design only package based upon the 100% drawings and specifications. A second "Construction" Submittal will be required to be submitted following completion of construction.
5. Minimum thresholds required for various LEED credits have been incorporated into the project specifications. These minimum thresholds are the minimum thresholds anticipated by the design team to ensure the project meets anticipated LEED Credit requirements. The Contractor shall coordinate product / manufacturer characteristics, give preference to manufacturers / products that exceed minimum thresholds, and ensure the project, as a whole, meets the required minimums needed to achieve the LEED Silver Goal.
6. All costs associated with project management and oversight of the LEED documentation, submission, and certification process shall be included in the Contractor's price.

**E. Building Systems Commissioning:**

1. Refer to specification section 01 9113 - General Commissioning Requirements, and other individual specifications sections for Contractor's responsibilities related to Building Systems Commissioning.

**F. Government 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 Government Furnished Contractor Installed (GFCI).

**G. Contractor's Qualified Fire Protection Engineer (QFPE) Services:**

1. The Contractor shall employ a Qualified Fire Protection Engineer (QFPE) meeting the requirements of UFC 3-600-01.
2. The QFPE shall review, sign, and certify all fire protection and life safety systems including; but, not limited to fire alarm, mass notification, and sprinkler systems included within the proposed project.

3. All shop drawing / calculations / material submittals for applicable life safety systems must be reviewed and stamped by the Contractor's QFPE in accordance with section 9-6.3 of UFC 3-600-01.
4. Waterflow testing shall be performed under the direction of the Contractor's QFPE in accordance with section 9-6.4 of UFC 3-600-01. Waterflow testing shall be performed by the Contractor in order to develop required hydraulic calculations. Use of waterflow testing performed by the Architect during design cannot be utilized by the Contractor for preparation of project submittals.
5. During Construction the Contractor's QFPE must visit the site in intervals/quantities required to certify that the system has been installed in accordance with the project requirements. At a minimum, the QFPE shall attend/witness the above ceiling inspection and attend/witness final acceptance testing for all fire protection and life safety systems. Additional site inspections are at the discretion of the Contractor's QFPE. The Contractor's QFPE shall certify, in writing, that the system has been installed in accordance with project requirements. The Contractor's QFPE certification shall be in writing, on company letterhead, and include the QFPE's registration stamp.

#### **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 Birmingham Building Permit is not 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 Government's approval.
  1. Other areas are off limits to all construction personnel.
- B. Access to site will be limited; obtain Government's approval of proposed routes of access.

- C. 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.
- D. Existing building space may not be used for storage.
- 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.
- 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. Provide access to and from the site and all facilities effected by the scope of work as required by law and by the Government.
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signage if exit routes are temporarily altered.
  - 2. Do no obstruct roadways, sidewalks, parking lots, drives, or other public ways without permit.
  - 3. Promptly remove mud, dirt, debris, etc... from sidewalks, streets, and public right-of-way during construction as it occurs.
    - a. Utilize covered waster receptacles to reduce waste and debris from leaving the project site and adversely effecting the Government's ongoing operations including the aircraft movements on the aircraft apron adjacent to the project site.
  - 4. Coordinate site lay down and storage areas with Government's Operations.
  - 5. Construction operations are not to affect any of the ongoing operations throughout 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, parking lots, right-of-ways, etc...
- H. Comply with the Government's security requirements. Refer to Specification Section 01 3553.

- I. The Contractor shall provide all testing, inspection, and similar services; these services also in close those specified to be performed by an independent agency.

#### **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 Civil Engineer.
- 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 WORK SEQUENCE**

- A. Coordinate construction schedule and operations with the Contracting Officer Representative.
- B. Coordinate construction activities with the ongoing KC-135 flying mission. Limit utility disruptions. If required utility outages impact adjacent facilities they must be coordinated in advance with the Government and occur over non-UTA weekends.

#### **1.08 PROJECT CONSULTANTS**

- A. The Architect, hereinafter referred to as Architect: Seay Seay & Litchfield P.C..

1. Address: 1115 South Court Street.
2. City, State, Zip: Montgomery AL 36104.
3. Phone: 334-263-5162.
4. Project Manager: David Donovan, AIA, LEED AP
5. Principals-in-Charge: Wes R. Osmer, AIA, LEED AP

- B. Architect's Consultants:

1. Civil Engineering:  
  
Professional Engineering Consultants  
  
822 South McDonough St..  
  
Montgomery, AL, 36104.  
  
Phone: 334-262-7307

Contact: Steve Green - Pat Moseley, PE

2. Structural Engineering:

Blackburn, Daniels, O'Barr

Address: County Road 40 E

Lowndesboro, AL 36752

Phone: 334-265-0206

Contact: Jack Daniels, PE

3. Plumbing, Mechanical & Fire Suppression Engineering:

Whorton Engineering

P.O. Box 5190

25 Summerall Gate Road, Bldg 2102

Anniston, Alabama 36205

Phone: (256)820-9897

Contact: Randy Whorton

4. Electrical Engineering:

McCarter Engineering

828 Avalon Lane

Anniston, AL 36207

Phone: (256) 240-7335

Contact: Stan McCarter

**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 Divisions 21, 22, 23, 26 & 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**

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## **SECTION 010500 - FIELD ENGINEERING**

### **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**

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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 Price and Contract Time.
- C. Procedures for preparation and submittal of application for final payment.

#### **1.02 RELATED REQUIREMENTS**

#### **1.03 SCHEDULE OF VALUES**

- A. Form to be used: Government's Approved Form.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to the Government for approval.
- C. 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, bonds and insurance, and material versus labor costs .
  - 1. Provide separate line items for material and labor for each item of work.
  - 2. Provide separate line items for each direct general contractor's cost for general conditions including:
    - a. Bonds
    - b. Insurance
    - c. Superintendent
    - d. Quality Control Representative
    - e. On Site Office Cost including rent (if applicable), utilities and supplies.
  - 3. Break larger items of work down into line items not exceeding \$50,000 in value unless specifically approved by the Government.
  - 4. Provide separate schedule of values for each facility included within the consolidated award.
- D. 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.
- E. Submit schedule of values within the timeframe outlined in the General Conditions of the Contract for Construction.

#### **1.04 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 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. 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.
- E. 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.

#### **1.05 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 Contractor 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.

#### **1.06 MODIFICATION PROCEDURES**

- A. Comply with all requirements of the General Conditions of the Contract for Construction.
- B. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
- C. Do not proceed with work associated with a modification prior to final execution of modification by Contracting Officer.
- D. Following execution of modification by the Contracting Officer, promptly:
  1. Revised 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 and change in Contract Time.
  3. Enter changes in Project Record Documents.

#### **1.07 APPLICATION FOR FINAL PAYMENT**

- A. Comply with all requirements of the General Conditions of the Contractor for Construction.
- B. 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. .

**A New Security Building**  
**117th Air Refueling Wing, Birmingham, AL**

**BRKR009063/12207**

**Type B3 (100%) Submittal**  
**June 2024**

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

## **SECTION 012300 - BID OPTIONS**

### **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 Government's Solicitation and applicable requirements of the Federal Acquisitions Register. 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 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 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 Alternate Bid Item.
- 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: Security Forces Parking Lot:**

1. This Bid Option shall include all plant, labor, and material for the construction of a new asphalt paved parking area along the South side of "B" street as indicated on the civil drawings. This bid option shall include, but is not limited to, the following scope of work :
  - a. Installation of new asphalt pavement areas as indicated to be part of bid option on the civil drawings.
  - b. New concrete curb and gutter at new parking area as indicated to be part of bid option on the civil drawings.
  - c. Additional cement concrete sidewalks as indicated to be part of bid option on the civil drawings.
  - d. Associated site grading and subgrade preparation in accordance with applicable project specifications to accomplish the work indicated as part of the bid option on the civil drawings.
2. If this bid option is not awarded, the existing curb and gutter along the South side of "B" street will remain without change and no parking areas will be provided in this area of the site.

**B. Bid Option No. 2: Mechanical Screen Wall:**

1. This Bid Option shall include all plant, labor, and material to install a landscape screen wall to conceal mechanical and electrical equipment near the Northwestern corner of the facility. This bid option shall include, but is not limited to, the following scope of work :
  - a. Installation of a CMU wall with brick cladding and cast stone coping on all sides of the mechanical courtyard as indicated on drawings 1 and 2 on sheet L1.1. Refer to landscaping and civil drawings for height of wall.
  - b. Installation of chain link fencing covering the top of mechanical courtyard as indicated on drawings 1 and 2 on sheet L1.1.
  - c. Installation of decorative metal gate as indicated on drawings 2, 3, and 4 on sheet L1.1.
2. If this bid option is not awarded, the base bid shall consist of the lower height CMU/Brick veneer retaining wall with painted steel guardrail depicted on drawing 5/L1.1. Gate depicted on sheet L1.1 will not be required as part of the base bid.

**C. Bid Option No. 3: Alternate Roof Configuration:**



1. This Bid Option shall include the alternate roof configuration, alternate roof bearing conditions, and alternate exterior elevations at rooms 129, 133a, 137, 143, and 147 shown on the drawings.
2. Included in the scope of this bid option is all plant, labor, and materials required to raise the roof bearing conditions and install alternate framing and roof configuration in rooms 129, 133a, 137, 143, and 147.
3. If this option is awarded, the Contractor shall provide the roof plan configuration indicated on drawing sheet A2.3A and the structural framing indicated on the bid option roof framing plan in order to provide the exterior elevations indicated on drawing sheet A4.1A.
4. Included in this bid option will be additional roof flashings, additional CMU wall assemblies, additional brick veneer, larger curtain wall assemblies, and alterations to the reflected ceiling plan as indicated on the bid option drawings. If the bid option is not awarded, the base bid shall consist of a consistent 12'-0" high CMU bearing height with roof configuration indicated on drawing sheet A2.3 and structural roof framing indicated on base bid roof framing plan.

**D. Bid Option No. 4: Alternate Finish Schedule:**

1. This Bid Option shall include upgraded interior finishes in various rooms as indicated on the drawings.
2. Included in the scope of this bid option is all plant, labor, and materials required to:
  - a. Provide and install Carpet Tile (CPT 1) in lieu of vinyl tile (VCT 1) in all areas indicated in the "Bid Option Floor Finish" column of the room finish schedule on drawing sheet A3.1. Extent of CPT 1 included in this bid option is also indicated on drawing 7/A9.1 "Floor Pattern Plan (Bid Option)."
  - b. Provide hard tile (HT-2) in lieu of sealed concrete flooring in all areas indicated in the "Bid Option Floor Finish" column of the room finish schedule on drawing sheet A3.1. Extent of HT-2 included in this bid option is also indicated on drawing 7/A9.1 "Floor Pattern Plan (Bid Option)."
  - c. Provide increased extents of hard tile finishes on walls where indicated on the "Bid Option" Wall finish column of the room finish schedule on drawing sheet A3.1. Extent of hard tile wall finish included in this bid option is also indicated on drawing sheet A6.2 and drawing numbers 6 through 10 on drawing sheet A6.3.

3. If this bid option is not awarded, the base bid shall include installation of floor finishes included in the "Base Bid Floor Finish" column of the room finish schedule on drawing sheet A3.1. Base bid floor finishes are also indicated on drawing 1/A9.1 "Floor Pattern Plan (Base Bid)."
4. If this bid option is not awarded, the base bid shall also consist of the limited hard tile wall finishes indicated on drawing sheet A6.1 and drawings 1 through 5 on drawing sheet A6.3.

**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. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Progress photographs.
- E. Coordination drawings.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 7000 - Execution and Closeout Requirements
- B. Section 01 7800 - Closeout Submittals

#### **1.03 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.

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

## **PART 3 EXECUTION**

### **3.01 PRECONSTRUCTION MEETING**

- A. Contractor will schedule a meeting after notice to proceed.
- B. Attendance Required:
  1. Contracting Officer Representative
  2. Architect.
  3. Contractor.
  4. All major sub contractors and suppliers.
  5. Contracting Officer.
- C. Agenda:
  1. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  2. Designation of personnel representing the parties to Contract and .
  3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  4. Scheduling.
  5. Use of "Newforma" online web application for RFI, submittals, etc... Refer to section 01 3001 for additional information.

- D. Architect will record minutes and distribute copies after meeting to participants, with copies to Architect, Contracting Officer Representative(s), Contracting Officer, participants, and those affected by decisions made.

### **3.02 PROGRESS MEETINGS**

- A. Contractor shall make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required: Job superintendent, Contractor's Project Manager, Contractor's Quality Control Supervisor, Contracting Officer, Contracting Officer Representative(s), 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.
- C. Agenda:
1. Review minutes of previous meetings.
  2. Review of work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.
  6. Maintenance of progress schedule.
  7. Corrective measures to regain projected schedules.
  8. Planned progress during succeeding work period.
  9. Maintenance of quality and work standards.
  10. Effect of proposed changes on progress schedule and coordination.

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

### **3.03 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.
- F. Conflicts in the Contract Documents: Where conflicts occur in the contract documents the more expensive option shall be included for the contractor's pricing purposes unless otherwise clarified in writing by the Government. Prior to execution of the work the Government shall be consulted of all options, and a decision will be rendered by the Government.



### **3.04 REPORTS**

- A. Daily Construction Reports: Prepare a daily construction report and email to all required parties by noon of the following work day, recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
  2. List of separate contractors at Project site.
  3. Approximate count of personnel at Project site.
  4. High and low temperatures and general weather conditions.
  5. Accidents.
  6. Meetings and significant decisions.
  7. Unusual events (refer to special reports).
  8. Stoppages, delays, shortages, and losses.
  9. Orders and requests of authorities having jurisdiction.
  10. Applicable photographs, noting location and condition.

### **3.05 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 the Government. Show existing conditions adjacent to property.

### **3.06 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.

**3.07 SUBMITTALS**

- A. See section 01 3001 - Submittals.**

**END OF SECTION**

## **SECTION 013001 - SUBMITTALS**

### **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.

SCHEDULE OF MATERIAL SUBMITTALS													PROJECT NUMBER		PROJECT TITLE		SOLICITATION/CONTRACT NO.		
													BRKR009063		A New Security & Services Training Facility		<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	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S 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								D		NTP + 21 DAYS								
2	Section 01 0500, Field Engineering, Certificates	D									NTP + 21 DAYS								
3	Section 01 0500, Field Engineering, Record Documents									D	NTP + 21 DAYS								
4	Section 01 0500, Field Engineering, Dig Permit									D	NTP + 21 DAYS								
5	Section 01 2000, Price and Payment Procedures, Schedule of Values, FAKZ189019									D	NTP + 21 DAYS								
6	Section 01 2000, Price and Payment Procedures, Schedule of Values, FAKZ999088									D	NTP + 21 DAYS								
7	Section 01 3000, Administrative Requirements, Project Manager Resume									D	NTP + 21 DAYS								
8	Section 01 3000, Administrative Requirements, Superintendent Resume									D	NTP + 21 DAYS								
9	Section 01 3000, Administrative Requirements, Proposed Schedule									D	NTP + 21 DAYS								
10	Section 01 3000, Administrative Requirements, Pre-Construction Photos									D	NTP + 21 DAYS								
11	Section 01 3000, Administrative Requirements, Construction Quality Control Resume									D	NTP + 21 DAYS								
12	Section 01 3001, Submittals, Shop Drawings		D								NTP + 21 DAYS								
13	Section 01 3001, Submittals, Product Data									D	NTP + 21 DAYS								
14	Section 01 3001, Submittals, Samples			D							NTP + 21 DAYS								
15	Section 01 3001, Submittals, Submittal Register									D	NTP + 21 DAYS								
16	Section 01 3001, Submittals, Certificates	D									NTP + 21 DAYS								
17	Section 01 4000, Quality Requirements, Testing Agency Qualifications									D	NTP + 21 DAYS								
18	Section 01 5460, Safety and Health, Site Specific Safety and Quality Control Plan	D									NTP + 21 DAYS								
19	Section 01 5460, Safety and Health, Hazardous Material Certificates									D	NTP + 21 DAYS								
20	Section 01 5719, Temporary Environmental Controls, Management Plan	D									NTP + 21 DAYS								
21	Section 01 5719, Temporary Environmental Controls, Finish Installation Schedule		D								NTP + 21 DAYS								
22	Section 01 5719, Temporary Environmental Controls, Air Containment Test Plan		D								NTP + 21 DAYS								
23	Section 01 5719, Temporary Environmental Controls, Ventilation Effectiveness									D	NTP + 21 DAYS								
24	Section 01 6000, Product Requirements, Product Data									D	NTP + 21 DAYS								
25	Section 01 6000, Product Requirements, Shop Drawings		D								NTP + 21 DAYS								

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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
26	Section 01 6000, Product Requirements, Samples			D							NTP + 21 DAYS							
27	Section 01 6116, Volatile Organic Compound (VOC) Content Restrictions, Product Data									D	NTP + 21 DAYS							
28	Section 01 7000, Execution and Closeout Requirements, Surveyor Qualifications									D	NTP + 21 DAYS							
29	Section 01 7000, Execution and Closeout Requirements, Surveyor Errors & Omissions Coverage									D	NTP + 21 DAYS							
30	Section 01 7000, Execution and Closeout Requirements, Record Documents									D	NTP + 21 DAYS							
31	Section 01 7000, Execution and Closeout Requirements, Demolition Plan		D							D	NTP + 21 DAYS							
32	Section 01 7000, Execution and Closeout Requirements, Demolition Firm Qualifications		D								NTP + 21 DAYS							
33	Section 01 7000, Execution and Closeout Requirements, Surveyor Errors & Omissions Coverage									D	NTP + 21 DAYS							
34	Section 01 7419, Construction Waste Management and Disposal, Waste Management Plan		D								NTP + 21 DAYS							
35	Section 01 7419, Construction Waste Management and Disposal, Waste Disposal Reports									D	NTP + 21 DAYS							
36	Section 01 7800, Closeout Submittals, Project Record Drawings									D	NTP + 21 DAYS							
37	Section 01 7800, Closeout Submittals, Project Record Specifications		D								NTP + 21 DAYS							
38	Section 01 7800, Closeout Submittals, Project Record Addenda									D	NTP + 21 DAYS							
39	Section 01 7800, Closeout Submittals, Project Record Change Orders									D	NTP + 21 DAYS							
40	Section 01 7800, Closeout Submittals, Project Record Reviewed Shop Drawings									D	NTP + 21 DAYS							
41	Section 01 7800, Closeout Submittals, Project Record Manufacturer's Installation Instructions		D								NTP + 21 DAYS							
42	Section 01 7800, Closeout Submittals, Project Record Operation & Maintenance Data					D					NTP + 21 DAYS							
43	Section 01 7800, Closeout Submittals, Project Record Care & Maintenance Data									D	NTP + 21 DAYS							
44	Section 01 7800, Closeout Submittals, Project Warranties & Bonds									D	NTP + 21 DAYS							
45	Section 01 7800, Closeout Submittals, Project Attic Stock/Extra Materials						3				NTP + 21 DAYS							
46	Section 01 7900, Demonstration and Training, Draft Training Plans										NTP + 21 DAYS							Quantity per specific specification sections
47	Section 01 7900, Demonstration and Training, Training Manuals									D	NTP + 21 DAYS							
48	Section 01 7900, Demonstration and Training, Training Reports									D	NTP + 21 DAYS							

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		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT				APPROVED
49	Section 01 7900, Demonstration and Training, Video Recordings									D	NTP + 21 DAYS							
50	Section 01 9113 - General Commissioning Requirements, Commissioning Schedule									D	NTP + 21 DAYS							
51	Section 01 9113 - General Commissioning Requirements, Start Up Plan									D	NTP + 21 DAYS							
52	Section 01 9113 - General Commissioning Requirements, Start Up Report									D	NTP + 21 DAYS							
53	Section 01 9113 - General Commissioning Requirements, Prefunctional Checklists									D	NTP + 21 DAYS							
54	<b>Division 2 - Existing Conditions</b>									D	NTP + 21 DAYS							
###	Section 02 7110, Foudnation Drainage Systems, Product Data	D									NTP + 21 DAYS							
###	Section 02 7110, Foudnation Drainage Systems, Sustainability Submittals									D	NTP + 21 DAYS							
###	Section 02 7110, Foundation Drainage Systems, Installer Qualifications									D	NTP + 21 DAYS							
62	<b>Division 3 - Concrete - Concrete</b>									D	NTP + 21 DAYS							
63	Section 03 3000, Cast-In-Place Concrete, Product Data										NTP + 21 DAYS							
64	Section 03 3000, Cast-In-Place Concrete, Samples									D	NTP + 21 DAYS							
65	Section 03 3000, Cast-In-Place Concrete, Test Reports			3							NTP + 21 DAYS							
66	Section 03 3000, Cast-In-Place Concrete, Manufacturer's Installation Instructions									D	NTP + 21 DAYS							
67	Section 03 3000, Cast-In-Place Concrete, Sustainable Design Submittal					D					NTP + 21 DAYS							
68	Section 03 3000, Cast-In-Place Concrete, Material Certificates									D	NTP + 21 DAYS							
69	Section 03 3000, Cast-In-Place Concrete, Formwork Shop Drawings	D									NTP + 21 DAYS							
70	Section 03 3000, Cast-In-Place Concrete, Steel Reinforcement Shop Drawings		D								NTP + 21 DAYS							
71	Section 03 3000, Cast-In-Place Concrete, Design Mix		D								NTP + 21 DAYS							
72	Section 03 3000, Cast-In-Place Concrete, Installer Qualifications									D	NTP + 21 DAYS							
73	<b>Division 4 - Masonry</b>									D	NTP + 21 DAYS							
74	Section 04 2000, Unit Masonry, Product Data										NTP + 21 DAYS							
75	Section 04 2000, Unit Masonry, Samples									D	NTP + 21 DAYS							
76	Section 04 2000, Unit Masonry, Manufacturer's Certificate			3							NTP + 21 DAYS							
77	Section 04 2000, Unit Masonry, Sustainability Submittals	D									NTP + 21 DAYS							
78	Section 04 7200, Cast Stone Masonry, Manufacturer's Qualification Data									D	NTP + 21 DAYS							
79	Section 04 7200, Cast Stone Masonry, Product Data									D	NTP + 21 DAYS							
80	Section 04 7200, Cast Stone Masonry, Shop Drawings									D	NTP + 21 DAYS							

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			SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT				REPORT
81	Section 04 7200, Cast Stone Masonry, Mortar Samples		D								NTP + 21 DAYS							
82	Section 04 7200, Cast Stone Masonry, Sustainability Submittals			3							NTP + 21 DAYS							
83	<b>Division 5 - Metals</b>									D	NTP + 21 DAYS							
84	Section 05 1200, Structural Steel Framing, Shop Drawings										NTP + 21 DAYS							
85	Section 05 1200, Structural Steel Framing, Mill Certificates		D								NTP + 21 DAYS							
86	Section 05 1200, Structural Steel Framing, Fabricator Qualification Data		D								NTP + 21 DAYS							
87	Section 05 1200, Structural Steel Framing, Erector Qualification Data		D								NTP + 21 DAYS							
88	Section 05 1200, Structural Steel Framing, Sustainability Submittals		D								NTP + 21 DAYS							
89	Section 05 2100, Steel Joist Framing, Shop Drawings									D	NTP + 21 DAYS							
90	Section 05 2100, Steel Joist Framing, Welder's Certificates		D								NTP + 21 DAYS							
91	Section 05 2100, Steel Joist Framing, Erector Qualifications		D								NTP + 21 DAYS							
92	Section 05 2100, Steel Joist Framing, Sustainability Submittals									D	NTP + 21 DAYS							
93	Section 05 3100, Steel Decking, Shop Drawings									D	NTP + 21 DAYS							
94	Section 05 3100, Steel Decking, Product Data		D								NTP + 21 DAYS							
95	Section 05 3100, Steel Decking, Certificates									D	NTP + 21 DAYS							
96	Section 05 3100, Steel Decking, Installation Instructions		D								NTP + 21 DAYS							
97	Section 05 3100, Steel Decking, Welder's Certificates					D					NTP + 21 DAYS							
98	Section 05 3100, Steel Decking, Installer Qualifications		D								NTP + 21 DAYS							
99	Section 05 3100, Steel Decking, Sustainability Submittals		D								NTP + 21 DAYS							
100	Section 05 4000, Cold Formed Metal Framing, Product Data									D	NTP + 21 DAYS							
101	Section 05 4000, Cold Formed Metal Framing, Shop Drawings									D	NTP + 21 DAYS							
102	Section 05 4000, Cold Formed Metal Framing, Manufacturer's Installation Instructions		D								NTP + 21 DAYS							
103	Section 05 4000, Cold Formed Metal Framing, Sustainability Submittals					D					NTP + 21 DAYS							
104	Section 05 4400, Cold Formed Metal Trusses, Product Data									D	NTP + 21 DAYS							
105	Section 05 4400, Cold Formed Metal Trusses, Shop Drawings									D	NTP + 21 DAYS							
106	Section 05 4400, Cold Formed Metal Trusses, Sustainability Submittals		D								NTP + 21 DAYS							
107	Section 05 4000, Cold Formed Metal Framing, Manufacturer Qualification									D	NTP + 21 DAYS							
108	Section 05 4000, Cold Formed Metal Framing, Installer Qualifications		D								NTP + 21 DAYS							
109	Section 05 5000, Metal Fabrications, Shop Drawings		D								NTP + 21 DAYS							
110	Section 05 5000, Metal Fabrications, Welder's Certificates		D								NTP + 21 DAYS							
111	Section 05 5000, Metal Fabrications, Sustainability Submittal		D								NTP + 21 DAYS							
112	Section 05 5213, Pipe and Tube Railings, Shop Drawings									D	NTP + 21 DAYS							



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			SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT REPORT				APPROVED
113	Section 05 5213, Pipe and Tube Railings, Sustainability Submittal	D								NTP + 21 DAYS								
114	<b>Division 6 - Wood, Plastics, and Composites</b>								D	NTP + 21 DAYS								
115	Section 06 1000, Rough Carpentry, Product Data								D	NTP + 21 DAYS								
116	Section 06 1000, Rough Carpentry, Sustainability Submittal								D	NTP + 21 DAYS								
117	Section 06 1500, Samples, Samples	D								NTP + 21 DAYS								
118	Section 06 1500, Samples, Sustainability Submittal			3						NTP + 21 DAYS								
119	Section 06 4100, Architectural Wood Casework, Shop Drawings								D	NTP + 21 DAYS								
120	Section 06 4100, Architectural Wood Casework, Samples	D								NTP + 21 DAYS								
121	Section 06 4100, Architectural Wood Casework, Sustainability Submittal			3						NTP + 21 DAYS								
122	Section 06 4100, Architectural Wood Casework, Fabricator Qualifications								D	NTP + 21 DAYS								
123	Section 06 8316, Fiberglass Reinforced Paneling, Product Data	D								NTP + 21 DAYS								
124	Section 06 8316, Fiberglass Reinforced Paneling, Samples								D	NTP + 21 DAYS								
125	Section 06 8316, Fiberglass Reinforced Paneling, Maintenance Materials			3						NTP + 21 DAYS								
126	Section 06 8316, Fiberglass Reinforced Paneling, Sustainability Submittals									END OF CONTRACT								
127	<b>Division 7 - Thermal &amp; Moisture Protection</b>								D	NTP + 21 DAYS								
133	Section 07 0100, Special Project Roofing Warranty, Warranty																	
134	Section 07 2100, Thermal Insulation, Product Data						D			NTP + 21 DAYS								
135	Section 07 2100, Thermal Insulation, Manufacturer's Installation Instructions								D	NTP + 21 DAYS								
136	Section 07 2100, Thermal Insulation, Sustainability Submittal					D				NTP + 21 DAYS								
137	Section 07 2119, Spray Foam Insulation, Product Data								D	NTP + 21 DAYS								
138	Section 07 2119, Spray Foam Insulation, Manufacturer's Installation Instructions								D	NTP + 21 DAYS								
139	Section 07 2119, Spray Foam Insulation, Manufacturer's Qualification					D				NTP + 21 DAYS								
140	Section 07 2119, Spray Foam Insulation, Certificates	D								NTP + 21 DAYS								
141	Section 07 2119, Spray Foam Insulation, Manufacturer's Verification	D								NTP + 21 DAYS								
142	Section 07 2119, Spray Foam Insulation, Sustainability Submittal	D								NTP + 21 DAYS								
143	Section 07 2119, Spray Foam Insulation, Installer Qualification								D	NTP + 21 DAYS								
144	Section 07 2500, Weather Barriers, Product Data	D								NTP + 21 DAYS								
145	Section 07 2500, Weather Barriers, Shop Drawings								D	NTP + 21 DAYS								
146	Section 07 2500, Weather Barriers, Certificates	D								NTP + 21 DAYS								

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147	Section 07 2500, Weather Barriers, Qualification Data	D								NTP + 21 DAYS							
148	Section 07 2500, Weather Barriers, Test Reports	D								NTP + 21 DAYS							
149	Section 07 2500, Weather Barriers, Manufacturer's Warranty								D	NTP + 21 DAYS							
150	Section 07 2500, Weather Barriers, Project Air Barrier Warranty						D			NTP + 21 DAYS							
151	Section 07 4113, Metal Roof Panels, Manufacturer's Qualifications					3				END OF CONTRACT							
152	Section 07 4113, Metal Roof Panels, Installer's Qualifications	D								NTP + 21 DAYS							
153	Section 07 4113, Metal Roof Panels, Product Data	D								NTP + 21 DAYS							
154	Section 07 4113, Metal Roof Panels, Shop Drawings								D	NTP + 21 DAYS							
155	Section 07 4113, Metal Roof Panels, Samples		D							NTP + 21 DAYS							
156	Section 07 4113, Metal Roof Panels, Sustainability Submittals			3						NTP + 21 DAYS							
157	Section 07 4113, Metal Roof Panels, Closeout Submittals								D	NTP + 21 DAYS							
158	Section 07 4113, Metal Roof Panels, Manufacturer's Field Inspection Reports								D	END OF CONTRACT							
159	Section 07 4213, Metal Wall Panels, Product Data	D								NTP + 21 DAYS							
160	Section 07 4213, Metal Wall Panels, Shop Drawings								D	NTP + 21 DAYS							
161	Section 07 4213, Metal Wall Panels, Samples			D						NTP + 21 DAYS							
162	Section 07 4213, Metal Wall Panels, Sustainability Submittals								D	NTP + 21 DAYS							
163	Section 07 4213, Metal Wall Panels, Closeout Submittals								D								
164	Section 07 4293, Metal Soffit Panels, Manufacturer Qualification								D	NTP + 21 DAYS							
165	Section 07 4293, Metal Soffit Panels, Installer Qualification	D								NTP + 21 DAYS							
166	Section 07 4293, Metal Soffit Panels, Product Data	D								NTP + 21 DAYS							
167	Section 07 4293, Metal Soffit Panels, Shop Drawings								D	NTP + 21 DAYS							
168	Section 07 4293, Metal Soffit Panels, Samples		D							NTP + 21 DAYS							
169	Section 07 4293, Metal Soffit Panels, Test Reports			3						NTP + 21 DAYS							
170	Section 07 4293, Metal Soffit Panels, Sustainability Submittal								D	NTP + 21 DAYS							
171	Section 07 4293, Metal Soffit Panels, Closeout Submittal								D	NTP + 21 DAYS							
172	Section 07 4800, Continuous Insulation Channel, Product Data	D								NTP + 21 DAYS							
173	Section 07 4800, Continuous Insulation Channel, Shop Drawings								D	NTP + 21 DAYS							
174	Section 07 4800, Continuous Insulation Channel, Structural Calculations								D	NTP + 21 DAYS							
175	Section 07 4800, Continuous Insulation Channel, Samples			3						NTP + 21 DAYS							
175	Section 07 4800, Continuous Insulation Channel, Test Reports								D	NTP + 21 DAYS							

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			SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS	DATA				DOCUMENT	APPROVED				DIS-APPROVED
176	Section 07 6200, Sheet Metal Flashing and Trim, Shop Drawings	D									NTP + 21 DAYS								
177	Section 07 6200, Sheet Metal Flashing and Trim, Samples	D									NTP + 21 DAYS								
178	Section 07 6200, Sheet Metal Flashing and Trim, Sustainability Submittals		D								NTP + 21 DAYS								
179	Section 07 6200, Sheet Metal Flashing and Trim, Fabricator and Installer Qualifications			3							NTP + 21 DAYS								
180	Section 07 6200, Sheet Metal Flashing and Trim, ES-1 Verification									D	NTP + 21 DAYS								
181	Section 07 6500, Wall Flashing, Product Data	D									NTP + 21 DAYS								
182	Section 07 6500, Wall Flashing, Shop Drawings	D									NTP + 21 DAYS								
183	Section 07 6500, Wall Flashing, Test Reports									D	NTP + 21 DAYS								
184	Section 07 6500, Wall Flashing, Warranty		D								NTP + 21 DAYS								
185	Section 07 7100, Roof Specialties, Product Data									D	NTP + 21 DAYS								
186	Section 07 7100, Roof Specialties, Samples						3				END OF CONTRACT								
187	Section 07 7100, Roof Specialties, Shop Drawings									D	NTP + 21 DAYS								
188	Section 07 7100, Roof Specialties, Sustainability Submittals			3							NTP + 21 DAYS								
189	Section 07 7100, Roof Specialties, Manufacturer Qualification Data		D								NTP + 21 DAYS								
190	Section 07 7100, Roof Specialties, Product Certificates									D	NTP + 21 DAYS								
191	Section 07 7100, Roof Specialties, Product Test Report									D	NTP + 21 DAYS								
192	Section 07 7100, Roof Specialties, Sample Warranty	D									NTP + 21 DAYS								
193	Section 07 7100, Roof Specialties, Closeout Submittal									D	NTP + 21 DAYS								
194	Section 07 9005, Joint Sealers, Product Data	D									NTP + 21 DAYS								
195	Section 07 9005, Joint Sealers, Samples	D									NTP + 21 DAYS								
196	Section 07 9005, Joint Sealers, Manufacturer's Sample Warranty									D	NTP + 21 DAYS								
197	Section 07 9005, Joint Sealers, Installation Instructions			3							NTP + 21 DAYS								
198	Section 07 9005, Joint Sealers, Manufacturer Qualifications					D					NTP + 21 DAYS								
199	Section 07 9005, Joint Sealers, Applicator Qualifications				D						NTP + 21 DAYS								
200	Section 07 9005, Joint Sealers, Sustainability Submittal	D									NTP + 21 DAYS								
201	Section 07 9005, Joint Sealers, Warranty	D									NTP + 21 DAYS								
202	<b>Division 8 - Openings</b>									D	NTP + 21 DAYS								
203	Section 08 1113, Hollow Metal Doors and Frames, Product Data						3				END OF CONTRACT								
204	Section 08 1113, Hollow Metal Doors and Frames, Shop Drawings																		
205	Section 08 1113, Hollow Metal Doors and Frames, Installation Instructions									D	NTP + 21 DAYS								
206	Section 08 1113, Hollow Metal Doors and Frames, Manufacturer Qualification		D								NTP + 21 DAYS								

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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
207	Section 08 1113, Hollow Metal Doors and Frames, Sustainability Submittals					D					NTP + 21 DAYS						
208	Section 08 1416, Flush Wood Doors, Product Data	D									NTP + 21 DAYS						
209	Section 08 1416, Flush Wood Doors, Shop Drawings								D		NTP + 21 DAYS						
210	Section 08 1416, Flush Wood Doors, Test Reports								D		NTP + 21 DAYS						
211	Section 08 1416, Flush Wood Doors, Samples		D								NTP + 21 DAYS						
212	Section 08 1416, Flush Wood Doors, Manufacturer's Instructions								D		NTP + 21 DAYS						
213	Section 08 1416, Flush Wood Doors, Manufacturer Qualifications			3							NTP + 21 DAYS						
214	Section 08 1416, Flush Wood Doors, Sample Warranty	D									NTP + 21 DAYS						
215	Section 08 1416, Flush Wood Doors, Sustainability Submittals	D									NTP + 21 DAYS						
216	Section 08 3100, Access Doors and Panels, Product Data					D					NTP + 21 DAYS						
217	Section 08 3100, Access Doors and Panels, Shop Drawings								D		NTP + 21 DAYS						
218	Section 08 3100, Access Doors and Panels,Manufacturer's Installation Instructions								D		NTP + 21 DAYS						
219	Section 08 3100, Access Doors and Panels,Sustainability Submittal		D								NTP + 21 DAYS						
220	Section 083459, Weapons Vault Door, Product Data					D					NTP + 21 DAYS						
221	Section 083459, Weapons Vault Door, Shop Drawings			D							NTP + 21 DAYS						
222	Section 083459, Weapons Vault Door, Manufacturer's Instructions								D		NTP + 21 DAYS						
223	Section 083459, Weapons Vault Door, Sustainability Submittals					D					NTP + 21 DAYS						
224	Section 083600, Sectional Overhead Doors, Product Data					D					NTP + 21 DAYS						
225	Section 083600, Sectional Overhead Doors, Shop Drawings			D							NTP + 21 DAYS						
226	Section 083600, Sectional Overhead Doors, Manufacturer's Instructions								D		NTP + 21 DAYS						
227	Section 083600, Sectional Overhead Doors, Operating and Maintenance Data								D		NTP + 21 DAYS						
228	Section 08 4113, Aluminum Framed Entrances, Product Data	D									NTP + 21 DAYS						
229	Section 08 4113, Aluminum Framed Entrances, Shop Drawings	D									NTP + 21 DAYS						
230	Section 08 4113, Aluminum Framed Entrances, Samples								D		NTP + 21 DAYS						
231	Section 08 4113, Aluminum Framed Entrances, Design Data		D								NTP + 21 DAYS						
232	Section 08 4113, Aluminum Framed Entrances, Sustainability Submittals			3							NTP + 21 DAYS						
233	Section 08 4113, Aluminum Framed Entrances, Draft Warranty								D		NTP + 21 DAYS						
234	Secion 08 4313, Aluminum Framed Storefronts, Product Data								D		NTP + 21 DAYS						
235	Secion 08 4313, Aluminum Framed Storefronts, Shop Drawings					D					NTP + 21 DAYS						

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236	Section 08 4313, Aluminum Framed Storefronts, Hardware Schedule									D	NTP + 21 DAYS								
237	Section 08 4313, Aluminum Framed Storefronts, Samples		D								NTP + 21 DAYS								
238	Section 08 4313, Aluminum Framed Storefronts, Manufacturer Qualifications									D	NTP + 21 DAYS								
239	Section 08 4313, Aluminum Framed Storefronts, Installer Qualification			3							NTP + 21 DAYS								
240	Section 08 4313, Aluminum Framed Storefronts, Sample Warranty	D									NTP + 21 DAYS								
241	Section 08 4313, Aluminum Framed Storefronts, Sustainability Submittals	D									NTP + 21 DAYS								
242	Section 08 4413, Glazed Aluminum Curtain Walls, Product Data						D				NTP + 21 DAYS								
243	Section 08 4413, Glazed Aluminum Curtain Walls, Shop Drawings								D		NTP + 21 DAYS								
244	Section 08 4413, Glazed Aluminum Curtain Walls, Samples								D		NTP + 21 DAYS								
245	Section 08 4413, Glazed Aluminum Curtain Walls, Test Reports		D								NTP + 21 DAYS								
246	Section 08 4413, Glazed Aluminum Curtain Walls, Design Data			3							NTP + 21 DAYS								
247	Section 08 4413, Glazed Aluminum Curtain Walls, Manufacturer's Certificate								D		NTP + 21 DAYS								
248	Section 08 4413, Glazed Aluminum Curtain Walls, Field Quality Control								D		NTP + 21 DAYS								
249	Section 08 4413, Glazed Aluminum Curtain Walls, Sample Warranty	D									NTP + 21 DAYS								
250	Section 08 4413, Glazed Aluminum Curtain Walls, Sustainability Submittal								D		NTP + 21 DAYS								
251	Section 08 5200, Blast Resistant Aluminum Window Systems, Product Data						D				NTP + 21 DAYS								
252	Section 08 5200, Blast Resistant Aluminum Window Systems, Shop Drawings								D		NTP + 21 DAYS								
253	Section 08 5200, Blast Resistant Aluminum Window Systems, Samples								D		NTP + 21 DAYS								
254	Section 08 5200, Blast Resistant Aluminum Window Systems, Test Reports		D								NTP + 21 DAYS								
255	Section 08 5200, Blast Resistant Aluminum Window Systems, Design Data			3							NTP + 21 DAYS								
256	Section 08 5200, Blast Resistant, Aluminum Window Systems, Manufacturer's Certificates								D		NTP + 21 DAYS								
257	Section 08 5200, Blast Resistant, Aluminum Window Systems, Field Quality Control								D		NTP + 21 DAYS								
258	Section 08 5200, Blast Resistant, Aluminum Window Systems, Warranty	D									NTP + 21 DAYS								
259	Section 08 5200, Blast Resistant, Aluminum Window Systems, Sustainability Submittal								D		NTP + 21 DAYS								
260	Section 08 7100, Door Hardware, Product Data						3				END OF CONTRACT								
261	Section 08 7100, Door Hardware, Hardware Schedule								D		NTP + 21 DAYS								

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			SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT REPORT			
262	Section 08 7100, Door Hardware, Keying Schedule								D	NTP + 21 DAYS							
263	Section 08 7100, Door Hardware, Maintenance Data		D							NTP + 21 DAYS							
264	Section 08 7100, Door Hardware, Warranty		D							NTP + 21 DAYS							
265	Section 08 7100, Door Hardware, Maintenance Materials								D	NTP + 21 DAYS							
266	Section 08 7100, Door Hardware, Product Test Reports						D			END OF CONTRACT							
267	Section 08 7100, Door Hardware, Manufacturer Qualifications								D	NTP + 21 DAYS							
268	Section 08 7100, Door Hardware, Installer Qualifications								D	NTP + 21 DAYS							
269	Section 08 7100, Door Hardware, Supplier Qualifications	D								NTP + 21 DAYS							
270	Section 08 8000, Glazing, Product Data	D								NTP + 21 DAYS							
271	Section 08 8000, Glazing, Samples	D								NTP + 21 DAYS							
272	Section 08 8000, Glazing, Sample Warranty								D	NTP + 21 DAYS							
273	Division 9 - Finishes						D			NTP + 21 DAYS							
274	Section09 0561, Common Work Results for Flooring Preparation, Testing Agency Report	D								NTP + 21 DAYS							
275	Section 09 2116, Gypsum Board Assemblies, Product Data																
276									D	NTP + 21 DAYS							
277	Section 09 2116, Gypsum Board Assemblies, Test Reports								D	NTP + 21 DAYS							
278	Section 09 2116, Gypsum Board Assemblies, Sustainability Submittals		D							NTP + 21 DAYS							
279	Section 09 2116, Gypsum Board Assemblies, Installer Qualifications								D	NTP + 21 DAYS							
280	Section 09 3000, Tiling, Product Data								D	NTP + 21 DAYS							
281	Section 09 3000, Tiling, Maintenance Data	D								NTP + 21 DAYS							
282	Section 09 3000, Tiling, Manufacturer Qualification								D	NTP + 21 DAYS							
283	Section 09 3000, Tiling, Installer Qualifications								D	NTP + 21 DAYS							
284	Section 09 3000, Tiling, Samples	D								NTP + 21 DAYS							
285	Section 09 3000, Tiling, Maintenance Materials	D								NTP + 21 DAYS							
286	Section 09 5100, Acoustical Ceilings, Product Data	D								NTP + 21 DAYS							
287	Section 09 5100, Acoustical Ceilings, Samples								D	NTP + 21 DAYS							
288	Section 09 5100, Acoustical Ceilings, Manufacturer's Installation Instructions								D	NTP + 21 DAYS							
289	Section 09 5100, Acoustical Ceilings, Sustainability Submittal			1						NTP + 21 DAYS							
290	Section 09 5100, Acoustical Ceilings, Maintenance Materials					D				NTP + 21 DAYS							
291	Section 09 5100, Acoustical Ceilings, Manufacturer Qualifications								D	NTP + 21 DAYS							
292	Section 09 6500, Resilient Base, Product Data			3						NTP + 21 DAYS							

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293	Section 09 6500, Resilient Base, Samples									D	NTP + 21 DAYS						
294	Section 09 6500, Resilient Base, Sustainability Submittals									D	NTP + 21 DAYS						
295	Section 09 6500, Resilient Base, Maintenance Data			3							NTP + 21 DAYS						
296	Section 09 6500, Resilient Base, Maintenance Materials									D	NTP + 21 DAYS						
297	Section 09 6500, Resilient Base, Installer Qualifications									D	NTP + 21 DAYS						
298	Section 09 6519, Resilient Tile Flooring, Product Data										END OF CONTRACT						
299	Section 09 6519, Resilient Tile Flooring, Installation Instructions	D									NTP + 21 DAYS						
300	Section 09 6519, Resilient Tile Flooring, Sample Warranty									D	NTP + 21 DAYS						
301	Section 09 6519, Resilient Tile Flooring, Samples				D						NTP + 21 DAYS						
302	Section 09 6813, Tile Carpeting, Product Data					D					NTP + 21 DAYS						
303	Section 09 6813, Tile Carpeting, Samples			3							NTP + 21 DAYS						
304	Section 09 6813, Tile Carpeting, Manufacturer's Instructions									D	NTP + 21 DAYS						
305	Section 09 6813, Tile Carpeting, Maintenance Data			3							NTP + 21 DAYS						
306	Section 09 6813, Tile Carpeting, Maintenance Materials				D						NTP + 21 DAYS						
307	Section 09 6813, Tile Carpeting, Sustainability Submittals							D			NTP + 21 DAYS						
308	Section 09 6813, Tile Carpeting, Manufacturer Qualifications										END OF CONTRACT						
309	Section 09 6813, Tile Carpeting, Installer Qualifications									D	NTP + 21 DAYS						
310	Section 09 9113, Exterior Painting, Product Data			1							NTP + 21 DAYS						
311	Section 09 9113, Exterior Painting, Samples									D	NTP + 21 DAYS						
312	Section 09 9113, Exterior Painting, Manufacturer's Certification									D	NTP + 21 DAYS						
313	Section 09 9113, Exterior Painting, Manufacturer's Instructions			3							NTP + 21 DAYS						
314	Section 09 9113, Exterior Painting, Maintenance Data	D									NTP + 21 DAYS						
315	Section 09 9113, Exterior Painting, Manufacturer Qualifications				D						NTP + 21 DAYS						
316	Section 09 9113, Exterior Painting, Applicator Qualifications							D			NTP + 21 DAYS						
317	Section 09 9113, Exterior Painting, Maintenance Material	D									NTP + 21 DAYS						
318	Section 09 9123, Interior Painting, Product Data	D									NTP + 21 DAYS						
319	Section 09 9123, Interior Painting, Samples										END OF CONTRACT						
320	Section 09 9123, Interior Painting, Manufacturer's Certification									D	NTP + 21 DAYS						
321	Section 09 9123, Interior Painting, Manufacturer's Instructions			3							NTP + 21 DAYS						
322	Section 09 9123, Interior Painting, Sustainability Submittals	D									NTP + 21 DAYS						
323	Section 09 9123, Interior Painting, Maintenance Data				D						NTP + 21 DAYS						
324	Section 09 9123, Interior Painting, Maintenance Materials									D	NTP + 21 DAYS						

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			SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT			
325	Section 09 9123, Interior Painting, Manufacturer Qualifications								D		NTP + 21 DAYS						
326	Section 09 9123, Interior Painting, Applicator Qualifications										END OF CONTRACT						
327	Division 10 - Specialties										END OF CONTRACT						
328	Section 10 1400, Signage, Product Data									D	NTP + 21 DAYS						
329	Section 10 1400, Signage, Signage Schedule	D									NTP + 21 DAYS						
330	Section 10 1400, Signage, Samples									D	NTP + 21 DAYS						
331	Section 10 1400, Signage, Installation Instructions		D								NTP + 21 DAYS						
332	Section 10 1400, Signage, Maintenance Materials			3							NTP + 21 DAYS						
333	Section 10 1400, Signage, Sustainability Submittals					D					NTP + 21 DAYS						
334	Section 10 1400, Signage, Manufacturer Qualifications										END OF CONTRACT						
335	Section 10 2113, Stainless Steel Toilet Compartments, Product Data									D	NTP + 21 DAYS						
336	Section 10 2113, Stainless Steel Toilet Compartments, Shop Drawings	D									NTP + 21 DAYS						
337	Section 10 2113, Stainless Steel Toilet Compartments, Samples									D	NTP + 21 DAYS						
338	Section 10 2113, Stainless Steel Toilet Compartments, Closeout Submittal		D								NTP + 21 DAYS						
339	Section 10 2113, Stainless Steel Toilet Compartments, Sustainability Submittal			1							NTP + 21 DAYS						
340	Section 10 2113, Stainless Steel Toilet Compartments, Manufacturer Qualifications									D	END OF CONTRACT						
341	Section 10 2113, Stainless Steel Toilet Compartments, Installer Qualifications									D	NTP + 21 DAYS						
342	Section 10 2800, Toilet Bath and Laundry Accessories, Product Data			3							NTP + 21 DAYS						
343	Section 10 2800, Toilet Bath and Laundry Accessories, Manufacturer's Instructions									D	NTP + 21 DAYS						
344	Section 10 4400, Fire Protection Specialties, Manufacturer's Instructions									D	NTP + 21 DAYS						
345	Section 10 4400, Fire Protection Specialties, Maintenance Data					D					NTP + 21 DAYS						
346	Section 10 4400, Fire Protection Specialties, Sustainability Submittals					D					NTP + 21 DAYS						
347	Section 10 8500, Specialties, Product Data					D					NTP + 21 DAYS						
348	Section 10 8500, Specialties, Shop Drawings									D	NTP + 21 DAYS						
349	Division 11 - Equipment									D	NTP + 21 DAYS						
350	Section 11 3013, Residential Appliances, Product Data									D	NTP + 21 DAYS						
351	Section 11 3013, Residential Appliances, Sample Warranties		D								NTP + 21 DAYS						
352	Section 11 3013, Residential Appliances, Sustainability Submittals									D	NTP + 21 DAYS						
353	Division 12 - Furnishings									D	NTP + 21 DAYS						
354	Section 12 2115, Operable Mesh Shades, Product Data									D	NTP + 21 DAYS						



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355	Section 12 2115, Operable Mesh Shades, Shop Drawings																
356	Section 12 2115, Operable Mesh Shades, Schedule								D	NTP + 21 DAYS							
357	Section 12 2115, Operable Mesh Shades, Samples		D							NTP + 21 DAYS							
358	Section 12 2115, Operable Mesh Shades, Certificates								D	NTP + 21 DAYS							
359	Section 12 2115, Operable Mesh Shades, Sustainability Submittals			3						NTP + 21 DAYS							
360	Section 12 2115, Operable Mesh Shades, Closeout Submittals	D								NTP + 21 DAYS							
361	Section 12 3600, Countertops and Window Sills, Product Data								D	NTP + 21 DAYS							
362	Section 12 3600, Countertops and Window Sills, Shop Drawings									END OF CONTRACT							
363	Section 12 3600, Countertops and Window Sills, Samples								D	NTP + 21 DAYS							
364	Section 12 3600, Countertops and Window Sills, Test Reports		D							NTP + 21 DAYS							
365	Section 12 3600, Countertops and Window Sills, Installation Instructions			3						NTP + 21 DAYS							
366	Section 12 3600, Countertops and Window Sills, Maintenance Data								D	NTP + 21 DAYS							
367	Section 12 4813, Entrance Floor Mats and Frames, Product Data					D				NTP + 21 DAYS							
368	Section 12 4813, Entrance Floor Mats and Frames, Shop Drawings								D	NTP + 21 DAYS							
369	Section 12 4813, Entrance Floor Mats and Frames, Samples								D	NTP + 21 DAYS							
370	Section 12 4813, Entrance Floor Mats and Frames, Maintenance Data		D							NTP + 21 DAYS							
371	Section 12 9313, Bicycle Racks, Product Data								D	NTP + 21 DAYS							
372	Section 12 6100, Bicycle Racks, Shop Drawings			D					D	NTP + 21 DAYS							
373	Section 12 6100, Bicycle Racks, Samples			D					D	NTP + 21 DAYS							
374	<b>Division 21 - Fire Protection</b>								D	NTP + 21 DAYS							
375	Section 21 0517, Sleeves and Sleeve Seals for Fire-Suppression Piping, Product Data								D	NTP + 21 DAYS							
376	Section 21 0518, Escutcheons for Fire-Suppression Piping, Product Data								D	NTP + 21 DAYS							
377	Section 21 0523, General-Duty Valves for Water-Based Fire Suppression Piping, Product Data								D	NTP + 21 DAYS							
378	Section 21 0529, Hangers and Supports for Fire-Suppression Piping and Equipment, Product Data								D	NTP + 21 DAYS							
379	Section 21 0529, Hangers and Supports for Fire-Suppression Piping and Equipment, Shop Drawings		D							NTP + 21 DAYS							
380	Section 21 0553, Identification for Fire-Suppression Piping and Equipment, Product Data								D	NTP + 21 DAYS							
381	Section 21 0553, Identification for Fire-Suppression Piping and Equipment, Samples			D						NTP + 21 DAYS							
382	Section 21 1119, Fire Department Connections, Product Data								D	NTP + 21 DAYS							
383	Section 21 1313, Wet Pipe Sprinkler System, Shop Drawings	D								NTP + 21 DAYS							
384	Section 21 1313, Wet Pipe Sprinkler System, Product Data									NTP + 21 DAYS							

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			SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT REPORT				APPROVED	DIS-APPROVED
385	Section 21 1313, Wet Pipe Sprinkler System, Design Data		D								NTP + 21 DAYS								
386	Section 21 1313, Wet Pipe Sprinkler System, Test Reports								D		NTP + 21 DAYS								
387	Section 21 1313, Wet Pipe Sprinkler System, Certificates								D		NTP + 21 DAYS								
388	Section 21 1313, Wet Pipe Sprinkler System, Operation and Maintenance Data									D	7 DAYS FROM TEST COMPLETION								
389	Section 21 1313, Wet Pipe Sprinkler System, Closeout Submittals	D									NTP + 21 DAYS								
390	Section 21 1313, Wet Pipe Sprinkler System, Fire Protection Specialist Qualifications								D		END OF CONTRACT								
391	Section 21 1313, Wet Pipe Sprinkler System, Fire Protection Installer Qualifications								D		NTP + 21 DAYS								
392	Section 21 1313, Wet Pipe Sprinkler System, Extra Materials	D									NTP + 21 DAYS								
393	Section 21 1313, Wet Pipe Sprinkler System, Coordination Drawings	D									NTP + 21 DAYS								
394	Section 21 1313, Wet Pipe Sprinkler System, Water Flow Test Report										END OF CONTRACT								
395	Section 21 1313, Wet Pipe Sprinkler System, Field Quality Control Reports		D								NTP + 21 DAYS								
396	Section 21 1313, Wet Pipe Sprinkler System, Field Test Report									D	NTP + 21 DAYS								
397	Division 22 - Plumbing									D	NTP + 21 DAYS								
398	Section 22 0510 Basic Mechanical Requirements, Shop Drawings		D							D	NTP + 21 DAYS								
399	Section 22 0510 Basic Mechanical Requirements Product Data, Product Data									D	NTP + 21 DAYS								
400	Section 22 0510, Basic Mechanical Requirements Product Data, Samples			D							NTP + 21 DAYS								
401	Section 22 0517, Sleeves and Sleeve Seals for Plumbing Piping, Product Data									D	NTP + 21 DAYS								
402	Section 22 0518, Escutcheons for Plumbing Piping, Product Data									D	NTP + 21 DAYS								
403	Section 22 0519, Meters and Gages for Plumbing Piping, Product Certificates	D									NTP + 21 DAYS								
404	Section 22 0519, Meters and Gages for Plumbing Piping, Product Data	D									NTP + 21 DAYS								
405	Section 22 0519, Meters and Gages for Plumbing Piping, Operation and Maintenance Data									D	NTP + 21 DAYS								
406	Section 22 0523.12, Ball Valves for Plumbing Piping, Product Data									D	NTP + 21 DAYS								
407	Section 22 0523.14, Check Valves for Plumbing Piping, Product Data									D	NTP + 21 DAYS								
408	Section 22 0523.15, Gate Valves for Plumbing Piping, Product Data									D	NTP + 21 DAYS								
409	Section 22 0529, Hangars and Supports for Plumbing Piping and Equipment, Product Data									D	NTP + 21 DAYS								
410	Section 22 0529, Hangars and Supports for Plumbing Piping and Equipment, Shop Drawings									D	NTP + 21 DAYS								

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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
411	Section 22 0529, Hangars and Supports for Plumbing Piping and Equipment, Welding Certificates									D	NTP + 21 DAYS							
412	Section 22 0553, Identification for Plumbing Piping and Equipment, Product Data		D								NTP + 21 DAYS							
413	Section 22 0719, Plumbing Piping Insulation, Product Data									D	NTP + 21 DAYS							
414	Section 22 0719, Plumbing Piping Insulation, Sustainability Submittals									D	NTP + 21 DAYS							
415	Section 22 0719, Plumbing Piping Insulation, Shop Drawings		D								NTP + 21 DAYS							
416	Section 22 0719, Plumbing Piping Insulation, Samples			D							NTP + 21 DAYS							
417	Section 22 0800, Commissioning of Plumbing, Qualification Data									D	NTP + 21 DAYS							
418	Section 22 0800, Commissioning of Plumbing, Construction Checklists									D	NTP + 21 DAYS							
419	Section 22 1116, Domestic Water Piping, Product Data										NTP + 21 DAYS							
420	Section 22 1116, Domestic Water Piping, Sustainability Submittals									D	NTP + 21 DAYS							
421	Section 22 1119, Domestic Water Piping Specialties, Product Data									D	NTP + 21 DAYS							
422	Section 22 1119, Domestic Water Piping Specialties, Field Quality-Control Test Reports									D	NTP + 21 DAYS							
423	Section 22 1119, Domestic Water Piping Specialties, Opration and Maintenance Data									D	NTP + 21 DAYS							
424	Section 22 1123.21, Inline, Domestic-Water Pumps, Product Data									D	NTP + 21 DAYS							
425	Section 22 1123.21, Inline, Domestic-Water Pumps, Sustainability Submittals									D	NTP + 21 DAYS							
426	Section 22 1123, Facility Natural-Gas Piping, Product Data										NTP + 21 DAYS							
427	Section 22 1123, Facility Natural-Gas Piping, Shop Drawings										NTP + 21 DAYS							
428	Section 22 1316, Sanitary Waste and Vent Piping, Field Quality-Control Inspection and Test Reports									D	NTP + 21 DAYS							
429	Section 22 13 19.13, Sanitary Drains, Product Data									D	NTP + 21 DAYS							
430	Section 22 1319, Sanitary Waste Piping Specialties, Product Data									D	NTP + 21 DAYS							
431	Section 22 3400, Fuel Fire, Domestic Water Heaters - Natural Gas, Product Data									D	NTP + 21 DAYS							
432	Section 22 3400, Fuel Fire, Domestic Water Heaters - Natural Gas, Shop Drawings						3				END OF CONTRACT							
433	Section 22, 3400, Fuel Fire, Domestic Water Heaters - Natural Gas, Operation and Mainteance Data									D	NTP + 21 DAYS							
434	Section 22 3400, Fuel Fire, Domestic Water Heaters - Natural Gas, Warranty		D								NTP + 21 DAYS							
435	Section 22 4213.13, Commercial Water Closets, Product Data									D	NTP + 21 DAYS							

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436	Section 22 4213.13, Commercial Water Closets, Sustainability Submittals								D	NTP + 21 DAYS							
437	Section 22 4213.13, Commercial Water Closets, Shop Drawings		D							NTP + 21 DAYS							
438	Section 22 4213.16, Commercial Urinals, Product Data								D	NTP + 21 DAYS							
439	Section 22 4213.16, Commercial Urinals, Sustainability Submittals								D	NTP + 21 DAYS							
440	Section 22 4213.16, Commercial Urinals, Shop Drawings		D							NTP + 21 DAYS							
441	Section 22 4216.13, Commercial Lavatories, Product Data		D							NTP + 21 DAYS							
442	Section 22 4216.13, Commercial Lavatories, Sustainability Submittals								D	NTP + 21 DAYS							
443	Section 22 4216.13, Commercial Lavatories, Shop Drawings		D							NTP + 21 DAYS							
444	Section 22 4216.16, Commercial Sinks, Product Data								D	NTP + 21 DAYS							
445	Section 22 4216.16, Commercial Sinks, Sustainability Submittals								D	NTP + 21 DAYS							
446	Section 22 4216.16, Commercial Sinks, Operation and Maintenance Data								D	NTP + 21 DAYS							
447	Section 22 4223, Commercial Showers, Product Data								D	NTP + 21 DAYS							
448	Section 22 4223, Commercial Showers, Sustainability Submittals								D	NTP + 21 DAYS							
449	Section 22 4223, Commercial Showers, Maintenance Data								D	NTP + 21 DAYS							
450	Section 22 4500, Emergency Plumbing Fixtures, Product Data								D	NTP + 21 DAYS							
451	Section 22 4500, Emergency Plumbing Fixtures, Shop Drawings		D							NTP + 21 DAYS							
452	Section 22 4500, Emergency Plumbing Fixtures, Test Reports								D	NTP + 21 DAYS							
453	Section 22 4500, Emergency Plumbing Fixtures, Maintenance Data								D	NTP + 21 DAYS							
454	Section 22 4716, Pressure Water Coolers, Product Data								D	NTP + 21 DAYS							
455	Section 22 4716, Pressure Water Coolers, Shop Drawings		D							NTP + 21 DAYS							
456	Section 22 4716, Pressure Water Coolers, Maintenance Data								D	NTP + 21 DAYS							
457	<b>Division 23 - Heating, Ventilating, &amp; Air Conditioning (HVAC)</b>								D	NTP + 21 DAYS							
458	Section 23 0510, Basic Mechanical Requirements, Shop Drawings		D							NTP + 21 DAYS							

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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
459	Section 23 0510, Basic Mechanical Requirements, Product Data								D	NTP + 21 DAYS									
460	Section 23 0510, Basic Mechanical Requirements, Samples			D						NTP + 21 DAYS									
461	Section 23 0517, Sleeves and Sleeve Seals for HVAC Piping, Product Data				D					NTP + 21 DAYS									
462	Section 23 0517, Sleeves and Sleeve Seals for HVAC Piping, Product Data								D	NTP + 21 DAYS									
463	Section 23 0517, Sleeves and Sleeve Seals for HVAC Piping, Sustainability Submittals								D	NTP + 21 DAYS									
464	Section 23 0518, Escutcheons for HVAC Piping, Product Data								D	NTP + 21 DAYS									
465	Section 23 0519, Meters and Gages for HVAC Piping, Product Data								D	NTP + 21 DAYS									
466	Section 23 0519, Meters and Gages for HVAC Piping, Shop Drawings		D							NTP + 21 DAYS									
467	Section 23 0519, Meters and Gages for HVAC Piping, Maintenance Data								D	NTP + 21 DAYS									
468	Section 23 05 23.11, Globe Valves for HVAC Piping, Product Data								D	NTP + 21 DAYS									
469	Section 23 0523.12, Ball Valves for HVAC Piping, Product Data								D	NTP + 21 DAYS									
470	Section 23 0523.13, Butterfly Valves for HVAC Piping, Product Data								D	NTP + 21 DAYS									
471	Section 23 0523.15, Gate Valves for HVAC Piping, Product Data								D	NTP + 21 DAYS									
472	Section 23 0529, Hangars and Supports for HVAC Piping and Equipment, Product Data								D	NTP + 21 DAYS									
473	Section 23 0529, Hangars and Supports for HVAC Piping and Equipment, Sustainability Submittals								D	NTP + 21 DAYS									
474	Section 23 0533, Heat Tracing for HVAC Piping, Product Data								D	NTP + 21 DAYS									
475	Section 23 0533, Heat Tracing for HVAC Piping, Shop Drawings		D							NTP + 21 DAYS									
476	Section 23 0533, Heat Tracing for HVAC Piping, Operation and Maintenance Data								D	NTP + 21 DAYS									
477	Section 23 0553, Identification for Piping and Equipment, Product Data								D	NTP + 21 DAYS									
478	Section 23 0553, Identification for Piping and Equipment, Samples			D						NTP + 21 DAYS									
479	Section 23 0593, Testing, Adjusting, and Balancing for HVAC, Preconstruction Submittal								D	NTP + 21 DAYS									
480	Section 23 0593, Testing, Adjusting, and Balancing for HVAC, Shop Drawings								D	NTP + 21 DAYS									
481	Section 23 0593, Testing, Adjusting, and Balancing for HVAC, Product Data								D	NTP + 21 DAYS									

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482	Section 23 0593, Testing, Adjusting, and Balancing for HVAC, Test Reports		D								NTP + 21 DAYS						
483	Section 23 0593, Testing, Adjusting, and Balancing for HVAC, Certificates								D		NTP + 21 DAYS						
484	Section 23 0593, Testing Adjusting and Balancing for HVAC, Instrument Calibration Reports								D		NTP + 21 DAYS						
485	Section 23 0593, Testing, Adjusting, and Balancing for HVAC, Testing Agency Qualifications	D									NTP + 21 DAYS						
486	Section 23 0713, Duct Insulation, Product Data								D		NTP + 21 DAYS						
487	Section 23 0713, Duct Insulation, Sustainable Submittals								D		NTP + 21 DAYS						
488	Section 23 0713, Duct Insulation, Shop Drawings		D								NTP + 21 DAYS						
489	Section 23 0713, Duct Insulation, Samples			D							NTP + 21 DAYS						
490	Section 23 0713, Duct Insulation, Qualification Data								D		NTP + 21 DAYS						
491	Section 23 0719, HVAC Piping Insulation, Product Data								D		NTP + 21 DAYS						
492	Section 23 0719, HVAC Piping Insulation, Shop Drawings					D					NTP + 21 DAYS						
493	Section 23 0800, Commissioning of HVAC, Qualification Data								D		NTP + 21 DAYS						
494	Section 23 0800, Commissioning of HVAC, Construction Checklist		D								NTP + 21 DAYS						
495	Section 23 0923, BACNET DDC Systems for HVAC, Shop Drawings								D		NTP + 21 DAYS						
496	Section 23 0923, BACNET DDC Systems for HVAC, Product Data								D		NTP + 21 DAYS						
497	Section 23 0923, BACNET DDC Systems for HVAC, Design Data		D								NTP + 21 DAYS						
498	Section 23 0923, BACNET DDC Systems for HVAC, Test Reports								D		NTP + 21 DAYS						
499	Section 23 0923, BACNET DDC Systems for HVAC, Certificates								D		NTP + 21 DAYS						
500	Section 23 0923, BACNET DDC Systems for HVAC, Manufacturer's Field Reports								D		NTP + 21 DAYS						
501	Section 23 0923, BACNET DDC Systems for HVAC, Operation and Maintenance Data	D									NTP + 21 DAYS						
502	Section 23 0923, BACNET DDC Systems for HVAC, Closeout Submittals								D		NTP + 21 DAYS						
503	Section 23 0923, BACNET DDC Systems for HVAC, Contractor's Qualifications								D		NTP + 21 DAYS						
504	Section 23 0993.11, Sequence of Operations for HVAC DDC, Product Data								D		NTP + 21 DAYS						
505	Section 23 0993.11, Sequence of Operations for HVAC DDC, Shop Drawings		D								NTP + 21 DAYS						
506	Section 23 2113, Hydronic Piping, Product Data										END OF CONTRACT						

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			SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT				REPORT
507	Section 23 2113, Hydronic Piping, Shop Drawings	D									NTP + 21 DAYS							
508	Section 23 2113, Hydronic Piping, Field Quality Control Test Reports								D		NTP + 21 DAYS							
509	Section 23 2113, Hydronic Piping, Operation and Maintenance Data	D									NTP + 21 DAYS							
510	Section 23 2116, Hydronic Piping Specialties, Product Data								D		NTP + 21 DAYS							
511	Section 23 2216, Hydronic Piping Sepcialties, Operation and Maintenance Data								D		NTP + 21 DAYS							
512	Section 232123, Hydronic Pumps, Product Data								D		NTP + 21 DAYS							
513	Section 232123, Hydronic Pumps, Shop Drawings	D									NTP + 21 DAYS							
514	Section 232123, Hydronic Pumps, Operation and Maintenance Data								D		NTP + 21 DAYS							
515	Section 23 2300, Refrigerant Piping, Product Data								D		NTP + 21 DAYS							
516	Section 23 2300, Refrigerant Piping, Shop Drawings								D		NTP + 21 DAYS							
517	Section 23 2300, Refrigerant Piping, Field Quality Control Test Reports								D		NTP + 21 DAYS							
518	Section 23 2300, Refrigerant Piping, Operation and Maintenance Data	D									NTP + 21 DAYS							
519	Section 23 2513, Water Treatment for Closed-Loop Hydonic Systems, Product Data								D		NTP + 21 DAYS							
520	Section 23 2513, Water Treatment for Closed-Loop Hydonic Systems, Shop Drawings	D									NTP + 21 DAYS							
521	Section 23 2513, Water Treatment for Closed-Loop Hydonic Systems, Operation and Maintenance Data								D		NTP + 21 DAYS							
522	Section 23 3113, Metal Ducts, Product Data								D		NTP + 21 DAYS							
523	Section 23 3113, Metal Ducts, Shop Drawings								D		NTP + 21 DAYS							
524	Section 23 3113, Metal Ducts, Coordination Drawings								D		NTP + 21 DAYS							
525	Section 23 3113, Metal Ducts, Field Quality Control Reports	D									NTP + 21 DAYS							
526	Section 23 3300, Duct Accessories, Product Data	D									NTP + 21 DAYS							
527	Section 23 3300, Duct Accessories, Shop Drawings								D		NTP + 21 DAYS							
528	Section 23 3300, Duct Accessories, Coordination Drawings								D		NTP + 21 DAYS							
529	Section 23 3300, Duct Accessories, Operation and Maintenance Data	D									NTP + 21 DAYS							
530	Section 23 3600, Air Terminal Units, Product Data								D		NTP + 21 DAYS							
531	Section 23 3600, Air Terminal Units, Sustainable Design Submittals								D		NTP + 21 DAYS							
532	Section 23 3600, Air Terminal Units, Shop Drawings	D									NTP + 21 DAYS							
533	Section 23 3600, Air Terminal Units, Operation and Maintenance Data								D		NTP + 21 DAYS							
534	Section 23 3713, Diffusers Registers and Grilles, Product Data	D									NTP + 21 DAYS							
535	Section 23 3713, Diffusers Registers and Grilles, Samples								D		NTP + 21 DAYS							
536	Section 23 3713, Diffusers Registers and Grilles, Coordination Drawings	D									NTP + 21 DAYS							

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537	Section 23 5216, Condensing Boilers, Product Data									D	NTP + 21 DAYS								
538	Section 23 5216, Condensing Boilers, Sustainable Submittals									D	NTP + 21 DAYS								
539	Section 23 5216, Condensing Boilers, Shop Drawings		D								NTP + 21 DAYS								
540	Section 23 5216, Condensing Boilers, Operation and Maintenance Data									D	NTP + 21 DAYS								
541	Section 23 7313.13, Indoor, Basic Air-Handling Units, Product Data									D	NTP + 21 DAYS								
542	Section 23 7313.13, Indoor, Basic Air-Handling Units, Sustainable Submittals									D	NTP + 21 DAYS								
543	Section 23 7313.13, Indoor, Basic Air-Handling Units, Shop Drawings		D								NTP + 21 DAYS								
544	Section 23 7313.13, Indoor, Basic Air-Handling Units, Operation and Maintenance Data									D	NTP + 21 DAYS								
545	Section 23 8126, Split-System Air-Conditioners, Product Data									D	NTP + 21 DAYS								
546	Section 23 8126, Split-System Air-Conditioners, Shop Drawings		D								NTP + 21 DAYS								
547	Section 23 8126, Split-System Air-Conditioners, Samples			D							NTP + 21 DAYS								
548	Section 23 8126, Split-System Air-Conditioners, Operation and Maintenance Data									D	NTP + 21 DAYS								
549	Section 23 8239.19, Wall and Ceiling Unit Heaters, Product Data									D	NTP + 21 DAYS								
550	Section 23 8239.19, Wall and Ceiling Unit Heaters, Shop Drawings		D								NTP + 21 DAYS								
551	Section 23 8239.19, Wall and Ceiling Unit Heaters, Operation and Maintenance Data									D	NTP + 21 DAYS								
552	<b>Division 26 - Electrical</b>									D	NTP + 21 DAYS								
553	Section 26 0513, Medium Voltage Cables, Product Data									D	NTP + 21 DAYS								
554	Section 26 0513, Medium Voltage Cables, Maintenance Data									D	NTP + 21 DAYS								
555	Section 26 0519, Conductors and Cables, Test Reports									D	NTP + 21 DAYS								
556	Section 26 0526, Grounding and Bonding for Electrical Systems, Product Data	D									NTP + 21 DAYS								
557	Section 26 0526, Grounding and Bonding for Electrical Systems, Field Quality Control Reports									D	NTP + 21 DAYS								
558	Section 26 0533, Raceways and Boxes, Product Data									D	NTP + 21 DAYS								
559	Section 26 0533, Raceways and Boxes, Shop Drawings		D								NTP + 21 DAYS								
560	Section 26 0533, Raceways and Boxes, Coordination Drawings	D									NTP + 21 DAYS								
561	Section 26 0544, Sleeves and Sleeve Seals for Electrical Raceways and Cabling, Product Data	D									NTP + 21 DAYS								



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562	Section 26 1219, Three Phase Pad Mounted Transformers, Shop Drawings	D									NTP + 21 DAYS								
563	Section 26 1219, Three Phase Pad Mounted Transformers, Product Data		D								NTP + 21 DAYS								
564	Section 26 1219, Three Phase Pad Mounted Transformers, Test Reports									D	NTP + 21 DAYS								
565	Section 26 1219, Three Phase Pad Mounted Transformers, Certificate		D								NTP + 21 DAYS								
566	Section 26 1219, Three Phase Pad Mounted Transformers, Manufacturer's Field Reports									D	NTP + 21 DAYS								
567	Section 26 1219, Three Phase Pad Mounted Transformers, Operation and Maintenance Data									D	NTP + 21 DAYS								
568	Section 26 2200, Dry-Type Transformers (100 V AND LESS), Product Data									D	NTP + 21 DAYS								
569	Section 26 2200, Dry-Type Transformers (100 V AND LESS), Qualification Data									D	NTP + 21 DAYS								
570	Section 26 2416, Panelboards, Maintenance Data									D	NTP + 21 DAYS								
571	Section 26 2416, Panelboards, Shop Drawings									D	NTP + 21 DAYS								
572	Section 26 2416, Panelboards, Certificates									D	NTP + 21 DAYS								
573	Section 26 2416, Panelboards, Field Quality Control Reports									D	NTP + 21 DAYS								
574	Section 26 2416, Panelboards, Panelboard Schedules		D								NTP + 21 DAYS								
575	Section 26 2416, Panelboards, Operation and Maintenance Data	D									NTP + 21 DAYS								
576	Section 26 2726, Wiring Devices, Product Data									D	NTP + 21 DAYS								
577	Section 26 2726, Wiring Devices, Maintenance Data									D	NTP + 21 DAYS								
578	Section 26 2813, Fuses, Product Data									D	NTP + 21 DAYS								
579	Section 26 2813, Fuses, Operation and Maintenance Data									D	NTP + 21 DAYS								
580	Section 26 2816, Enclosed Switches and Circuit Breakers, Product Data									D	NTP + 21 DAYS								
581	Section 26 2816, Enclosed Switches and Circuit Breakers, Shop Drawings									D	NTP + 21 DAYS								
582	Section 26 2816, Enclosed Switches and Circuit Breakers, Certificates									D	NTP + 21 DAYS								
583	Section 26 2816, Enclosed Switches and Circuit Breakers, Field Quality Control Reports									D	NTP + 21 DAYS								
584	Section 26 2816, Enclosed Switches and Circuit Breakers, Operation and Maintenance Data		D								NTP + 21 DAYS								
585	Section 26 5100, Interior Lighting, Shop Drawings		D								NTP + 21 DAYS								
586	Section 26 5100, Interior Lighting, Product Data									D	NTP + 21 DAYS								
587	Section 26 5100, Interior Lighting, Test Reports	D									NTP + 21 DAYS								
588	Section 26 5100, Interior Lighting, Certificates		D								NTP + 21 DAYS								

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589	Section 26 5600, Exterior Lighting, Product Data								D	NTP + 21 DAYS							
590	Section 26 5600, Exterior Lighting, Shop Drawings		D							NTP + 21 DAYS							
591	Division 27 - Communications								D	NTP + 21 DAYS							
592	Section 27 0525, Communication & Data Processing Equipment, Product Data								D	NTP + 21 DAYS							
593	Section 27 0525, Communication & Data Processing Equipment, Shop Drawings		D							NTP + 21 DAYS							
594	Section 27 0525, Communication & Data Processing Equipment, Qualification Data								D	NTP + 21 DAYS							
595	Section 27 0525, Communication & Data Processing Equipment, Maintenance Data								D	NTP + 21 DAYS							
596	Division 28 - Electrical Safety and Security								D	NTP + 21 DAYS							
597	Section 28 3111, Fire Alarm and Mass Notification System, Product Data								D	NTP + 21 DAYS							
598	Section 28 3111, Fire Alarm and Mass Notification System, Shop Drawings		D							NTP + 21 DAYS							
599	Section 28 3111, Fire Alarm and Mass Notification System, Certificates	D								NTP + 21 DAYS							
600	Division 31 - Earthwork								D	NTP + 21 DAYS							
601	Section 31 0200, Temporary Erosion and Sediment Control, Certificate							D		NTP + 21 DAYS							
602	Section 31 0200, Temporary Erosion and Sediment Control, Inspection Report								D	END OF CONTRACT							
603	Section 31 0200, Temporary Erosion and Sediment Control, Sustainability Submittal																
604	Section 31 1001, Site Clearing, Record Drawings	D								NTP + 21 DAYS							
605	Section 31 2210.00, Earthwork, Material Test Reports								D	NTP + 21 DAYS							
606	Section 31 3116, Termite Control, Product Data								D	NTP + 21 DAYS							
607	Section 31 3116, Termite Control, Test Reports							D		END OF CONTRACT							
608	Section 31 3116, Termite Control, Manufacturer's Application Instructions								D	NTP + 21 DAYS							
609	Section 31 3116, Termite Control, Maintenance Data								D	NTP + 21 DAYS							
610	Section 31 3116, Termite Control, Warranty								D	NTP + 21 DAYS							
611	Division 32 - Exterior Improvments				D					NTP + 21 DAYS							
612	Section 32 1217, Asphalt Concrete Paving, Material Certificates							D		NTP + 21 DAYS							
613	Section 32 1314, Cement Concrete Paving, Product Data					3				END OF CONTRACT							
614	Section 32 1314, Cement Concrete Paving, Design Mixes																

SCHEDULE OF MATERIAL SUBMITTALS													PROJECT NUMBER		PROJECT TITLE		SOLICITATION/CONTRACT NO.		
													BRKR009063		A New Security & Services Training Facility		<CONTRACT #>		
TO BE COMPLETED BY PROJECT MANAGER													TO BE COMPLETED BY CONTRACT ADMINISTRATOR						
LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL	NO. OF COPIES REQUIRED								REQUIRED SUBMISSION DATE	DATE TO CIVIL ENGINEERING	RETURN SUSPENSE DATE	DATE CONTRACTOR NOTIFIED		CONTRACTOR RESUBMITTAL	FINAL APPROVAL	REMARKS		
		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECOMMENDATIONS	MANUFACTURER'S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS				DATA	DOCUMENT \ REPORT				APPROVED	DIS-APPROVED
615	Section 32 1314, Cement Concrete Paving, Test Reports	D									NTP + 21 DAYS								
616	Section 32 1314, Cement Concrete Paving, Certificates								D		NTP + 21 DAYS								
617	Section 32 1314, Cement Concrete Paving, Sustainability Submittals								D		NTP + 21 DAYS								
618	Section 32 1720, Pavement Joint Sealants, Product Certificates			1							NTP + 21 DAYS								
619	Section 32 3136, Security Bollards, Shop Drawings				D						NTP + 21 DAYS								
620	Section 32 3136, Security Bollards, Sustainability Submittals							D			NTP + 21 DAYS								
621	Section 32 9219, Seeding, Maintenance Data								D		NTP + 21 DAYS								
622	Section 32 9219, Seeding, Maintenance Contract	D									NTP + 21 DAYS								
623	Section 32 9219, Seeding, Sustainability Submittals	D									NTP + 21 DAYS								
624	<b>Division 33 - Utilities</b>								D		NTP + 21 DAYS								
625	Section 33 1117, Outside Water System, Product Data	D									NTP + 21 DAYS								
626	Section 33 13112, Sanitary Sewer, Product Data							D			NTP + 21 DAYS								
627	Section 33 13112, Sanitary Sewer, Sustainability Submittals																		
628	Section 33 13112, Sanitary Sewer, Test Reports								D		NTP + 21 DAYS								
629	Section 33 4112, Storm Drainage, Product Data								D		NTP + 21 DAYS								
630	Section 33 4112, Storm Drainage, Sustainability Submittal								D		NTP + 21 DAYS								
631	Section 33 7350, Site Natural Gas Distribution, Product Data								D		NTP + 21 DAYS								
632	Section 33 7350, Site Natural Gas Distribution, Manufacturer's Certificates								D		NTP + 21 DAYS								

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## **SECTION 013514.01 - LEED-NC 2009 CREDIT SUMMARY**

### **PART 1 GENERAL**

#### **1.01 DEFINITIONS**

- A. LEED Rating System: LEED-NC 2009 edition.
- B. Required: Achievement of this credit is essential for certification of this project.
- C. Preferred: Achievement of this credit would be desirable but is not mandatory.
- D. Not Required: Achievement of this credit is not expected or not possible for this project.

#### **1.02 PROCEDURES:**

- A. The project has already be registered with the USGBC. The USGBC Project Registration Access # is 731138092111319.
- B. Contractor will be granted access to LEED online software for documentation of Construction submittal credits.
- C. Contractor shall be solely responsible for accurate and correct documentation of all Construction submittals. If a Construction submittal template has information already filled in upon granting the Contractor access to LEED online, that information is for the Contractor's information only and is intended to represent the design teams goals and thresholds for expected LEED credits.
- D. All design credits will be documented by the Architect and appropriate consulting engineers.
- E. The submittal costs for LEED registration will be paid by the Architect is accordance with the Contract for architectural services.

### **PART 2 CREDIT SUMMARY**

#### **2.01 CERTIFICATION TO BE ACHIEVED: LEED Certified, requiring minimum of 40 points.**

#### **2.02 SUSTAINABLE SITES (SS): 9 Points To Be Achieved.**

- A. SS Prerequisite 1 - Required - No points - Construction Activity Pollution Prevention.
- B. SS Credit 1 - Required- 1 point - Site Selection.

1. The project is not located on any of the inappropriate or environmentally sensitive lands defined for this credit.
- C. SS Credit 4.2 - Required - 1 point - Alternative Transportation: Bicycle Storage & Changing Rooms.
  1. Secure bicycle storage and shower and changing facilities are to be provided.
    - a. Lockers are specified in Section 105100.
  2. Bicycle racks are specified in Section 129313.
- D. SS Credit 4.3 - Required - 3 points - Alternative Transportation: Low-Emitting & Fuel-Efficient Vehicles.
  1. Preferred parking spaces have been provided, in the quantity required.
- E. SS Credit 4.4 - Required - 2 points - Alternative Transportation: Parking Capacity.
  1. Preferred parking spaces are to be provided, in the quantity required.
- F. SS Credit 7.2 - Required - 1 point - Heat Island Effect: Roof.
  1. The roofing design reduces thermal gradient differences by:
    - a. Using high reflectance and high emissivity roofing for at least 75 percent of roof area.
- G. SS Credit 8 - Required - 1 point - Light Pollution Reduction.
  1. Appropriate exterior lighting fixtures are specified.
  2. Appropriate interior lighting fixtures are specified.

### **2.03 WATER EFFICIENCY (WE): 8 Points To Be Achieved.**

- A. WE Prerequisite 1 - Required - No points - Water Use Reduction, 20% Reduction.
  1. Appropriate high efficiency and/or waterless fixtures are specified in Section 224000.
- B. WE Credit 1.1 - Required - 2 points - Water Efficient Landscaping: Reduce by 50%.
  1. The only landscaping included in this project is in planters.
  2. The landscaping does not require irrigation and no permanent irrigation system is provided.

- a. The climate provides adequate rainfall for the landscaping intended without need for irrigation.
- C. WE Credit 1.2 - Required - 2 points - Water Efficient Landscaping: No Potable Use or No Irrigation.
  - 1. The landscaping does not require irrigation and no permanent irrigation system is provided.
    - a. The climate provides adequate rainfall for the landscaping intended without need for irrigation.
- D. WE Credit 3.1 - Required - 2 points - Water Use Reduction, 30% Reduction.
  - 1. Appropriate high efficiency and/or waterless fixtures are specified in Section 224000.
- E. WE Credit 3.1 - Required - 2 points for 40% Reduction - Water Use Reduction.
  - 1. Same solutions as for WE Credit 3.1, but greater reduction.

**2.04 ENERGY & ATMOSPHERE (EA): 6 Points To Be Achieved.**

- A. EA Prerequisite 1 - Required - No points - Fundamental Commissioning of Building Energy Systems.
  - 1. Commissioning performed by and under the supervision of an independent commissioning authority is to be provided by the owner.
- B. EA Prerequisite 2 - Required - No points - Minimum Energy Performance.
  - 1. The building envelope, HVAC, lighting, etc., have been designed to meet the criteria.
  - 2. The overall design solution is implemented in drawings and many sections of the specifications.
- C. EA Prerequisite 3 - Required - No points - Fundamental Refrigerant Management.
  - 1. New equipment: No CFC-based refrigerants are used in any equipment.
- D. EA Credit 1 - Required - 1 points - Optimize Energy Performance.
  - 1. The building envelope, HVAC, lighting, etc., have been designed to meet the criteria for the number of points indicated.

2. The overall design solution is implemented in drawings and many sections of the specifications.
- E. EA Credit 5 - Required - 3 points - Measurement & Verification.
1. Continuous metering systems that meet the credit criteria are to be provided.
- F. EA Credit 6 - Required - 2 points - Green Power.
1. The Contractor shall purchase, on behalf of the Government, renewable energy certificates (REC) providing at least 830 Mwh (mega watt-hour) of electricity from renewable sources, as defined by the Center for Resource Solutions' Green-e Energy product certification requirements, or an equivalent. If the green power is not Green-e Energy certified, equivalence must exist for both major Green-e Energy program criteria: 1) current green power performance standards, and 2) independent, third-party verification that those standards are being met by the green power supplier over time. An example of Green-e certified renewable energy available for purchase at the time of project design is RECs through Alabama Power. Contact Liz Philpot, Renewable Resources Manager and Resource Planning, (205) 257-5315, or [efphilpo@southernco.com](mailto:efphilpo@southernco.com) for pricing and purchasing information.
  2. Submittal: Executed sales agreement contract for purchase of 830 Mwh of electricity from renewable sources in compliance with Green-e requirements or equivalent. Sales agreement to include language indicating the purchase of the RECs is for the project "BANG Security and Services Training Facility."

**2.05 MATERIALS & RESOURCES: 6 Points To Be Achieved.**

- A. MR Prerequisite 1 - Required - No points - Storage & Collection of Recyclables.
1. The area designated for collection and storage of recyclables is indicated on the drawings.
- B. MR Credit 2.1 - Required - 1 point - Construction Waste Management, Divert 50% from Disposal.
1. Construction procedures and measurement of diverted waste are specified in Section 017419. This section requires the Contractor to perform the measurement and computation.
- C. MR Credit 2.2 - Required - 1 point - Construction Waste Management, Divert 75% from Disposal.
1. Same as for MR Credit 2.1, but increased quantity.



- D. MR Credit 4.1 - Required - 1 point - Recycled Content: 10% (post-consumer plus 1/2 pre-consumer).
1. This project is steel-framed and contains many other steel-containing products; submission of a complete list of all metal-containing products will be required, with documentation showing steel mill source and mill process, allowing computation by using industry-averages for recycled content.
  2. Concrete using recycled materials such as fly ash to replace Portland cement as much as possible while retaining strength and design requirements is specified in:
    - a. Section 033000 - Cast-in-Place Concrete.
  3. Other specific products that must contain recycled content are specified in the appropriate section(s).
  4. Contractor is required to achieve this credit through selection of products (materials and equipment) plus any mandatory recycled content specified in the contract documents; this requirement is specified in Section 016000.
- E. MR Credit 4.2 - Required - 1 point - Recycled Content: 20% (post-consumer plus 1/2 pre-consumer).
1. Same as for MR Credit 4.1, but increased quantity.
- F. MR Credit 5.1 - Required - 1 point - Regional Materials: 10% Extracted, Processed & Manufactured Regionally.
1. Other specific products that must be regionally-sourced are specified in the appropriate section(s).
  2. Contractor is required to achieve this credit through selection of materials, plus any mandatory regionally-sourced product specified in the contract documents; this requirement is specified in Section 016000.
- G. MR Credit 5.2 - Required - 1 point - Regional Materials: 20% Extracted, Processed & Manufactured Regionally.
1. Same as for MR Credit 5.1, but for an additional 10%.

## **2.06 INDOOR ENVIRONMENTAL QUALITY: 12 Points To Be Achieved.**

- A. EQ Prerequisite 1 - Required - No points - Minimum IAQ Performance.
1. The building ventilation system has been shown to provide the minimum outdoor ventilation rate prescribed by ASHRAE 62.1-2010.

2. The building ventilation has been designed to meet the minimum requirements of ASHRAE 62.1-2010.
  3. The overall design solution is implemented in drawings and many sections of the specifications.
- B. EQ Prerequisite 2 - Required - No points - Environmental Tobacco Smoke (ETS) Control.
1. Owner intends to prohibit smoking in the building.
  2. Exterior smoking areas are located at least 25 feet (8 meters) away from entries, outdoor air intakes, and operable windows.
- C. EQ Credit 1 - Required - 1 point - Outdoor Air Delivery Monitoring.
1. Outdoor airflow measurement devices in HVAC system, integrated with HVAC control system, are specified in Section 230913.
- D. EQ Credit 3.1 - Required - 1 point - Construction IAQ Management Plan, During Construction.
1. Good construction procedures intended to prevent future problems are specified in Section 015719.
- E. EQ Credit 3.2 - Required - 1 point - Construction IAQ Management Plan, Before Occupancy.
1. Contractor is required to perform either a full building flush-out or air quality testing prior to occupancy, both of which are specified in Section 015719.
- F. EQ Credit 4.1 - Required - 1 point - Low-Emitting Materials, Adhesives & Sealants.
1. Product criteria and reporting requirements for VOC-restricted products are specified in Section 016116.
- G. EQ Credit 4.2 - Required - 1 point - Low-Emitting Materials, Paints & Coatings.
1. Product criteria and reporting requirements for VOC-restricted products are specified in Section 016116.
- H. EQ Credit 4.3 - Required - 1 point - Low-Emitting Materials, Flooring Systems.
1. Product criteria and reporting requirements for VOC-restricted products are specified in Section 016116.

- I. EQ Credit 4.4 - Required - 1 point - Low-Emitting Materials, Composite Wood & Agrifiber Products.
  - 1. Product criteria and reporting requirements for VOC-restricted products are specified in Section 016116.
  - 2. The products covered by this credit include ONLY particleboard, plywood, medium density fiberboard (MDF), wheatboard, strawboard, panel substrates, door cores, and laminating adhesives used on-site or in the shop.
  - 3. A project-wide prohibition on use of these products if they contain added urea-formaldehyde is specified.
- J. EQ Credit 5 - Required - 1 point - Indoor Chemical & Pollutant Source Control.
  - 1. At High Volume Entryways: Permanent grilles or grates to capture dirt, etc., are provided.
    - a. Floor mats and recessed frames are specified in Section 124813.
  - 2. Rooms Where Hazardous Gases or Chemicals May Be Present: Independent exhaust is provided for each room; this is a design solution involving building construction and HVAC.
- K. EQ Credit 6.1 - Required - 1 point - Controllability of Systems: Lighting.
  - 1. Lighting controls meeting the criteria are to be provided.
- L. EQ Credit 6.2 - Required - 1 point - Controllability of Systems: Thermal Comfort.
  - 1. HVAC Controls: Individual controls are to be provided for at least 50 percent of occupants in regularly occupied areas.
- M. EQ Credit 7.1 - Required - 1 point - Thermal Comfort: Design.
  - 1. Thermal comfort meeting the credit criteria is to be provided, with ventilation by mechanical means only.
  - 2. The overall design solution is implemented in drawings and many sections of the specifications.
- N. EQ Credit 8.1 - Required - 1 point - Daylight & Views: Daylighting.
  - 1. Daylighting to meet the credit criteria is to be provided.
  - 2. The overall design solution is implemented in the drawings with light-admitting materials specified in many sections of the specifications.

**2.07 INNOVATION & DESIGN PROCESS (ID): 5 Points To Be Achieved.**

- A. ID Credit 1.1 - Required - 1 point - Innovation in Design: Recycled content exemplary performance credit. Contractor to provide materials in compliance with MR Credit 4.1 but in increased quantity as required to achieve exemplary performance..
- B. ID Credit 1.2 - Required - 1 point - Innovation in Design: EBOM monitoring.
  - 1. Provide monitoring devices as shown on the drawings in order to achieve this innovation in design credit.
- C. ID Credit 1.3 - Required - 1 point - Innovation in Design: Regional Materials exemplary performance credit. Contractor to provide materials in compliance with MR Credit % but in increased quantity as required to achieve exemplary performance. .
- D. ID Credit 1.4 - Required - 1 point - Innovation in Design: green power exemplary performance credit. Contractor shall purchase Green Power Credits in an amount required to equal 70% of the building anticipated electricity usage.
- E. ID Credit 2 - Required - 1 point - LEED(tm) Accredited Professional.
  - 1. At least one principal participant of the project team has successfully completed the LEED Accredited Professional exam, including:
    - a. Project Architect

**2.08 REGIONAL PRIORITY (RP): 2 Point To Be Achieved.**

- A. RP Credit 1.2 - Required - 1 point - Region Specific Environmental Priority : Successful completion of Water Efficiency Credit 3 will achieve a regional priority credit for the project location Region.
- B. RP Credit 1.3 - Required - 1 point - Region Specific Environmental Priority : Successful completion of EQ Credit 7.1 will achieve a regional priority credit for the project location. Region.

**END OF SECTION**

## **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. 01 0102 - Project Information & Summary

#### **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.

#### **1.04 PERSONNEL IDENTIFICATION**

- A. The Government will issue personnel identification for all Contractor and Subcontractor personnel needing access to the site.
- B. The Contractor shall provide all information required for background checks to meet installation access requirements.
- C. 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 in 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.
- D. All Contractor's personnel shall display the Base issued Contractor identification badge at all times while present on site.
- E. Comply with the Government's requirements for return and/or disposal of badges at expiration of Contractor's employment on the Work.

**1.05 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 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
- 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; 2024.
- B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2023.
- C. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2023.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.
- B. Design Data: Submit for the Government's knowledge for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for the 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/applicaiton subcontractor to the Government in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  2. Certificates may be recent or previous test results on material or product, but must be acceptable to 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 benefit.
  - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- G. Erection Drawings: Submit drawings for the Government's benefit.
  - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

#### **1.05 TESTING AND INSPECTION AGENCIES AND SERVICES**

- 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. 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.
- E. 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.
- F. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.
- G. 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 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-compliance 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 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-compliance with specified requirements shall be performed by the same agency on instructions by the Government.

F. Re-testing required because of non-compliance with 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 complying with specified requirements.

**END OF SECTION**

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## **SECTION 014100 - REGULATORY REQUIREMENTS**

### **PART 1 GENERAL**

#### **1.01 SUMMARY OF REFERENCED STANDARDS**

- A. Regulatory requirements applicable to this project are the following:
1. All applicable National, State and Local Codes
  2. Alabama State Fire Marshall
  3. 117th Air Refueling Wing 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 15-01-00 ANG Design Policy
    - b. ANGETL 15-01-02 SCIF and ATFP Guidance
    - c. ANGETL 15-01-03 Fire Protection and Design
    - d. ANGETL 15-01-04 Mechanical Engineering

- e. ANGETL 15-01-05 Electrical and Communications Engineering
  - f. ANGETL 15-01-06 Roof Design Guidance
  - g. ANGETL 15-01-07 Airfield and Vehicle Pavement
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
  - b. Series 3-100: UFC 3-101-01, 3-110-03, 3-120-01, 3-120-10, 3-190-06
  - c. Series 3-200: UFC 3-201-01, 3-201-02, 3-210-10, 3-220-01, 3-250-01, 3-250-03, 3-250-04
  - d. Series 3-300: UFC 3-301-01
  - e. Series 3-400: UFC 3-400-02, 3-401-01, 3-410-01, 3-410-02, 3-420-01, 3-430-01FA, 3-450-01
  - f. Series 3-500: UFC 3-501-01, 3-520-01, 3-530-01, 3-550-01, 3-570-01, 3-575-01, 3-580-01
  - g. Series 3-600: UFC 3-600-01
  - h. Series 4: UFC 4-010-01, 4-021-01, 4-021-02, 4-215-01, 4-610-01, 4-740-02
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.



## **1.02 RELATED REQUIREMENTS**

- A. Section 014000 - Quality Requirements.

## **1.03 QUALITY ASSURANCE**

- A. Contractor's Designer Qualifications:

1. Refer to Section - 014000-Quality Requirements.
2. Where delegated engineering design is to be performed under the construction contract, provide the direct supervision of Professional Engineer experienced in the design of this type of work and licensed in the State of Alabama.

## **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**

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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. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.
- G. Project identification sign.
- H. Field offices.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 015100 - Temporary Utilities.
- B. Section 015213 - Field Offices and Sheds.
- C. Section 015500 - Vehicular Access and Parking.

#### **1.03 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office(s) at time of project mobilization.
  - 1. Telecommunications services shall be for the contractor's use.
- B. Telecommunications services shall include:
  - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
  - 2. Internet Connections: Minimum of five; 500 megabits per second download speed or faster.

#### **1.04 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

- B. Maintain daily in clean and sanitary condition.

### **1.05 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, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

### **1.06 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.

### **1.07 SECURITY**

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

### **1.08 VEHICULAR ACCESS AND PARKING - See Section 015500**

- A. Coordinate access and haul routes with governing authorities and Contracting Officer Representative(s).
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

### **1.09 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.

#### **1.10 PROJECT IDENTIFICATION**

- A. Provide project identification sign of design, construction, and location approved by the Government. Sign shall minimum 4'-0" by 8'-0" constructed of 3/4" XT grade plywood with 3/4" x 1-5/8" pressure treated wood border. Mount sign on pressure treated 4" x 4" posts. Paint sign background white with sign text in contrasting colors.
- B. Sign to contain the following minimum information:
  - 1. Project Name(s)
  - 2. General Contractor's Company Information
  - 3. Architect's Company Information
  - 4. Government's Point of Contact (as directed by the Contracting Officer)
  - 5. Contractor's primary points of contact including emergency contact for each project
  - 6. Include architectural renderings of the project(s). Architect's office will furnish a digital file of the design for the Contractor's use in fabricating the project sign.
  - 7. All required legal postings.
- C. No other signs are allowed without Owner permission except those required by law.

#### **1.11 FIELD OFFICES - See Section 015213**

#### **1.12 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to 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.

**A New Security Building**  
**117th Air Refueling Wing, Birmingham, AL**

**BRKR009063/12207**

**Type B3 (100%) Submittal**  
**June 2024**

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

## **SECTION 015100 - TEMPORARY UTILITIES**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Temporary Utilities: Provision of 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.

#### **1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

#### **1.04 TEMPORARY ELECTRICITY**

- A. Connect to the Government's existing power service.
  - 1. Cost: By the Government.
  - 2. Provide power service required from utility source.
- B. Provide temporary electric feeder from utility electrical service at location as directed.
- C. Complement existing power service capacity and characteristics as required.
- D. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.
- E. Provide main service disconnect and over-current protection at convenient location and meter.
- F. Permanent convenience receptacles may be utilized during construction.
- G. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

#### **1.05 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES**

- A. Provide and maintain the type lighting suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.

- B. Provide and maintain 1 watt/sq ft (10.8 watt/sq m) lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be utilized during construction.

#### **1.06 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. Exercise measures to conserve energy.
- D. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. 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.

#### **1.07 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. Exercise measures to conserve energy.
- D. Prior to operation of permanent equipment for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. 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.

#### **1.08 TEMPORARY VENTILATION**

- A. Permanent equipment may not be used for construction ventilation.

- 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.

#### **1.09 TEMPORARY WATER SERVICE**

- A. Cost of Water Used: By the Government.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Connect to existing water source.
- D. 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**

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## **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 01 0102 - Project Information and Summary
- 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.
- B. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- C. Other Furnishings: Contractor's option.
- D. Equipment: Six adjustable band protective helmets for visitors, one 10 inch (250 mm) outdoor weather thermometer .
- E. The Government and Architect 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: Four hard surfaced parking spaces for use by the Government, 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**



## **SECTION 015460 - SAFETY AND HEALTH**

### **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**

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## **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 01 0102 Project Information and Summary

### **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 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 the 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 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 01 3514.01 - LEED Credit Summary
- 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 3514.01 - LEED Credit 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**

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## **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 014000 - Quality Requirements: Product quality monitoring.
- B. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- C. Section 017419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

#### **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:
  - 1. If used on interior, have lower emissions, as defined in Section 016116.
  - 2. If wet-applied, have lower VOC content, as defined in Section 016116.
  - 3. Are extracted, harvested, and/or manufactured closer to the location of the project.
  - 4. Have longer documented life span under normal use.
  - 5. Result in less construction waste. See Section 017419
  - 6. Are made of recycled materials.
  - 7. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.

8. If bio-based, other than wood, are or are made of Sustainable Agriculture Network certified products.
9. Have a published GreenScreen Chemical Hazard Analysis.

### **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. Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or approved equal" comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product, unless noted otherwise in specific specification section.
- F. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
- G. 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.
- H. 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.



- I. Visual Matching: Where Specifications require matching an established Sample, the Government's decision will be final on whether a proposed product matches satisfactorily.
- J. 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.
- K. 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. ADVANTOR Systems for furnishing and installation of Intrusion Detection, Access Control, and Closed Circuit TV systems.
  - 2. Monaco Enterprises, Inc., for fire alarm transceiver antennae for communication with existing base fire alarm reporting systems.
  - 3. BEST Access System Lockset for door coores/locks. Contractor shall ensure all cylinders and other door hardware components are compatible with specified BEST systems and capable of receiving BEST cores.
- 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 request is directly related to an "or equal" clause or similar language in the Contract Documents.
  5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
  6. A substantial advantage is offered the Government, in terms of cost, time, energy conservation or other considerations of merit
  7. 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.
  8. 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.
  9. 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.

**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**

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**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 3514.01 - LEED Credit 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://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.
    - d. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

- e. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; [www.otcair.org](http://www.otcair.org); specifically:
- 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 Cushion: Provide products having VOC content not greater than that required for CRI Green Label certification.
  - 1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Current Green Label Certification.
    - b. Report of laboratory testing performed in accordance with requirements.
- F. Carpet Tile and Adhesive: Provide products having VOC content not greater than that required for CRI Green Label Plus certification.
  - 1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Current Green Label Plus Certification.
    - b. Report of laboratory testing performed in accordance with requirements.
- G. 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

3. Evidence of Compliance: Acceptable types of evidence are:
  - a. Published product data showing compliance with requirements.

### **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**

## **SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

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

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 0102 Projection 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 3514.01 - LEED Credit Summary
- D. Section 014000 - Quality Requirements: Testing and inspection procedures.
- E. Section 015100 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.
- F. Section 017800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- G. Section 017900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

- H. Section 024100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

### **1.03 REFERENCE STANDARDS**

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

### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of the Government or separate Contractor.
- D. 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 surveying 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. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

- 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. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

#### **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 specifications 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 indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After 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 the Government's 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 the 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(s), other meeting 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.

### **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 Government 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 prior to final project assessment.
- 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.
- 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 the contract for additional requirements.
- C. Beneficial Occupancy
  - 1. Notify the Government when work is considered ready for 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 Contracting Officer, Contracting Officer's Representative(s), Architect, Architect's Consultants, Base Fire Department, and other required attendees.
  - 4. Upon completion of the Final Inspection, if the work is deemed to have achieved beneficial occupancy, 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 Contracting Officer Representative 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 Contracting Officer Representative.
  4. Upon completion of reinspection, the Contracting Officer 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 the Contracting Officer.

### **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.

### **END OF SECTION**

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

### **PART 1 GENERAL**

#### **1.01 WASTE MANAGEMENT REQUIREMENTS**

- A. The 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. LEED Compliance for this project is dependent on diversion of 75 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 01 3514.01 - LEED Credit Summary
- C. Section 015000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- D. Section 016000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- E. Section 017000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.
- F. 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. LEED 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 Contracting Officer.
  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 2 PRODUCTS - NOT APPLICABLE**

## **PART 3 EXECUTION**

### **3.01 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.

### **3.02 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: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 3514.01 - LEED Credit Summary
- C. Section 017000 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. 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 Contracting Officer Representative 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**

### **3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  1. Drawings.
  2. Specifications.
  3. Addenda.
  4. Change Orders and other modifications to the Contract.
  5. Reviewed shop drawings, product data, and samples.
  6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by the Government.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  1. Manufacturer's name and product model and number.
  2. Product substitutions or alternates utilized.
  3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  1. Field changes of dimension and detail.
  2. Details not on original Contract drawings.

- G. The Government will review project record documents on a monthly basis to ensure changes in the work are being accurately recorded.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
  - 1. Product data, with catalog number, size, composition, and color and texture designations.
  - 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.

### **3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.

2. Identify function, normal operating characteristics, and limiting conditions.
  3. Include performance curves, with engineering data and tests.
  4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. 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.

### **3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for Government 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 Architect, 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 Architect, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    - a. Significant design criteria.
    - b. List of equipment.

- c. Parts list for each component.
  - d. Operating instructions.
  - e. Maintenance instructions for equipment and systems.
  - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
- 3. Part 3: Project documents and certificates, including the following:
  - a. Shop drawings and product data.
  - 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 Architect, 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.

### **3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with 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**

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## **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: The 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 the Government's subsequent use.

1. Format: DVD Disc.
2. Label each disc and container with session identification and date.

**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 the 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. The 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 Government 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 Government personnel to be trained; re-schedule training sessions as required by the 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 Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
  - 2. Verify and document that functional performance is in accordance with Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
  - 3. Verify that operation and maintenance manuals submitted to the Government are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
  - 4. Verify that the Government 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 and Functional Completion.
- 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 Government
  - 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. Communications:
  1. Voice and data systems.
  2. Public address/paging.
- G. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- H. 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 3514.01 - LEED Credit Summary

- B. Section 015719 - Temporary Environmental Controls: Precautions and procedures; smoking room testing; building flush-out.
- C. Section 017000 - Execution and Closeout Requirements: General startup requirements.
- D. Section 017800 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.
- E. Section 017900 - Demonstration and Training: Scope and procedures for Government personnel training.
- F. Section 230800 - Commissioning of HVAC: HVAC control system testing; other requirements.

#### **1.04 REFERENCE STANDARDS**

- A. CSI/CSC MF - Masterformat; 2016.
- B. PEI (Samples) - Sample Forms for Prefunctional Checklists and Functional Performance Tests; Current Edition.

#### **1.05 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedure, except:
- B. Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
  - 1. Manufacturer's product data, cut sheets, and shop drawings.
  - 2. Manufacturer's installation instructions.
  - 3. Startup, operating, and troubleshooting procedures.
  - 4. Fan and pump curves.
  - 5. Factory test reports.
  - 6. Warranty information, including details of Owner's responsibilities in regard to keeping warranties in force.
- C. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.
- D. Startup Plans and Reports.
- E. Completed Prefunctional Checklists.

## **PART 2 PRODUCTS**

### **2.01 TEST EQUIPMENT**

- A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of 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 the 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 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. PEGI (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 Contractor's option.
  - 6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
  - 7. Submit completed Checklists to Commissioning Authority within two days of completion.
- C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.

1. Initial Drafts: Contractor is responsible for initial draft of Prefunctional Checklist where so indicated in Contract Documents.
  2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
  3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in Contract Documents or not.
  4. When asked to review the proposed Checklists, do so in a timely manner.
- D. Commissioning Authority Witnessing: Required for:
1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
  2. A sampling of non-primary equipment, as allowed by the commissioning plan.
- E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to 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 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 Government and Commissioning Authority personnel time witnessing re-testing.
5. Contractor shall bear the cost of 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 Contract Documents; where Functional Test procedures are not included in Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
2. Examples of Functional Testing:
  - a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
  - b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
  - c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.

- d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.
- 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 gauges, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
- B. Calibrate using the methods described below; alternate methods may be used, if approved by Commissioning Authority and 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, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.

3. If not, install offset, calibrate or replace sensor.

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

1. Disconnect sensor.
2. Connect a signal generator in place of sensor.
3. Connect ammeter in series between transmitter and building automation system control panel.
4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
7. Record all values and recalibrate controller as necessary to comply with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
8. Reconnect sensor.
9. Make a reading with a calibrated test instrument within 6 inches (150 mm) of the site sensor.
10. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
11. If not, replace sensor and repeat.
12. For pressure sensors, perform a similar process with a suitable signal generator.

**F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:**

1. Watthour, Voltage, Amperage: 1 percent of design.
2. Pressure, Air, Water, Gas: 3 percent of design.
3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F (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 CO2 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 furnished by the Architect 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**

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## **SECTION 024100 - DEMOLITION**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Building demolition .
- B. Selective demolition of built site elements.
- C. Abandonment and removal of existing utilities and utility structures.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 0102 Project Information & Summary
- B. Section 01 2300 - Bid Options
- C. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- D. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- E. 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.
- F. Section 017419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- G. Section 311000 - Site Clearing: Vegetation and existing debris removal.
- H. Section 31 0200 - Temporary Erosion and Sediment Control

#### **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. Demolition of Buildings 202, 204, 205, and 214 in their entirety.
  1. The buildings to be demolished will not be empty. The Government will remove all existing fixtures, furniture, and equipment required to be salvaged prior to the start of demolition. All items remaining within the building at the start of demolition will be the responsibility of the Contractor to remove from the site. The Contractor may, at their discretion, salvage, re-use, recycle, or dispose of all fixtures, furniture, and equipment not removed from the facility prior to the start of demolition.
  2. Demolition of buildings 204, 205, and 214 shall be included in the base bid proposal.
  3. Demolition of building 214 to be included within Bid Option #3. See drawing sheet C2.1A and specification section 01 2300.
- B. Remove paving and curbs as required to accomplish new work.
- C. Removal and relocation of existing utilities within the project site as indicated on the drawings.

- D. Visit site prior to bid and verify all existing conditions, existing structures, finishes, and location of work area.
- E. 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 the 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 Contracting Officer; 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 rout 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 the 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 Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

### **3.04 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.
- J. Comply with all applicable requirements of the expected LEED Credits to be achieved.

**END OF SECTION**

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## **SECTION 027110 - FOUNDATION DRAINAGE SYSTEMS**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 01 3514.01 LEED Credit Summary
- C. Section 01 6000 - Product Requirements

#### **1.02 SUMMARY**

- A. This Section includes foundation, subsoil drainage systems.
- B. Related Sections. The following Sections contain requirements that relate to this Section:
  - 1. Division 31 Section "Earthwork" for excavating, trenching, and backfilling.
  - 2. Division 33 Section "Storm Drainage" for connections to storm drainage systems.
  - 3. Division 3 Section "Cast-in-Place Concrete" for concrete cleanout anchors.
  - 4. Division 7 Section for waterproofing.

#### **1.03 SUBMITTALS**

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for the following:
  - 1. Solid pipe for tight joints.
  - 2. Perforated piping.
  - 3. Drainage conduits.
- C. Sustainability Submittals, Product data for LEED 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

#### **1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experience Installer who has completed foundation drainage systems similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

#### **1.05 COORDINATION**

- A. Coordinate foundation drainage system installation with excavating, trenching, and backfilling.
- B. Coordinate piping termination with storm drainage system.

#### **1.06 PROJECT CONDITION**

- A. Site Information: Verify all existing utility conditions.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Government or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated.

#### **1.07 LEED REQUIREMENTS**

- A. Materials specified shall have a post-consumer content as follows:
  - 1. Steel - Recycled Content: 30% Post-consumer content, minimum.
  - 2. HDPE - Recycled Content: 100% Post-consumer content, minimum.
  - 3. PVC - Recycled Content: 5% Post-consumer content, minimum.

### **PART 2 PRODUCTS**

#### **2.01 PIPES AND FITTINGS**

- A. General: Include pipes, fittings, couplings, and joint materials.
- B. Cast-Iron Soil Pipe and Fittings: ASTM A 74, Service and Extra-Heavy classes, hub-and-spigot ends, gray, cast iron, for gasketed joints.
  - 1. Gaskets: ASTM C 564, rubber, of thickness matching class of pipe.
- C. Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 3034, SDR 35, bell-and-spigot ends, for gasketed joints.



1. Gaskets: ASTM F 477, elastomeric seal.
- D. Perforated, Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

## **2.02 SPECIAL PIPE COUPLINGS**

- A. Description: Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined. Include the following specific sleeve materials, where available:
  1. Cast-Iron Soil Pipe: ASTM C 564, rubber.
  2. Plastic Pipe: ASTM F 477, elastomeric seal.
  3. Dissimilar Pipes: Compatible with pipe materials being joined.
  4. Bands: Stainless steel, at least 1 at each pipe insert.

## **2.03 SLEEVES**

- A. Steel Pipe Sleeves: ASTM A 53; Type F or Type E, Grade A; Schedule 40; galvanized.
- B. Cast-Iron Sleeves: Cast or fabricated wall pipe with integral water stop, made for this application.
- C. Cast-Iron Pipe Sleeves: ASTM A 74, Service class, cast-iron soil pipe.

## **2.04 DRAINAGE CONDUITS**

- A. Description: Smooth, rigid, perforated, polyvinyl chloride (PVC) conduit system, with fittings. Conduit system is equivalent to ASTM D 2729 PVC piping.
  1. Conduit: Extruded from ASTM D 4216, PVC compound material. Special fittings with outlet include 4-inch outlet connection.
  2. Minimum Flow Rate: Equal to or greater than 4-inch.
  3. Couplings: PVC fittings.

## **2.05 SOIL MATERIALS**

- A. Impervious Fill: Clayey gravel and sand mixture capable of compacting to dense state.
- B. Aggregate Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate, Size No. 57, with 100 percent passing 1-1/2 inch sieve and not more than 5 percent passing No. 8 sieve.

- C. Granular Fill Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with no more than 50 percent passing No. 50 sieve and no more than 5% passing the No. 200 sieve.

## **2.06 GEOTEXTILE FILTER FABRIC**

**A. Geotextile Fabric:**

1. Nonwoven geotextile made up of polypropylene fibers with the following characteristics
  - a. Non-biodegradable and resistant to soil chemicals, acids, and alkali with a pH range of 3 to 12.
  - b. 6.0 oz/square yard weight per ASTM D5261
  - c. 160 grab tensile strength in accordance with ASTM D4632
  - d. 50% grab elongation per ASTM D4632
  - e. 60 lbs trapezoidal tear per ASTM D4533
  - f. CBR Puncture of 410 lbs per ASTM D6241
  - g. 1.5 second permittivity per ASTM D4491
  - h. 110 gpm/square foot water flow rate in accordance with ASTM D4491
  - i. 70% UV resistance @ 500 hours per ASTM D4355

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine surfaces and areas for suitable conditions where foundation drainage systems are to be installed. Do not proceed until unsatisfactory conditions have been corrected.

### **3.02 FOUNDATION DRAINAGE SYSTEM APPLICATIONS**

**A. Systems with 4-Inch Piping: As follows:**

1. Perforated, polyvinyl chloride (PVC) sewer pipe and fittings for loose, bell-and-spigot joints.

### **3.03 SPECIAL PIPE-COUPLING APPLICATIONS**

- A. Use where indicated and where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.

### **3.04 PIPING INSTALLATION**

- A. Drawing plans and details indicate general location and arrangement of foundation drainage system piping.
- B. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing, solidly in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
  - 1. Install piping pitched down in direction of flow, at a minimum slope of 1.5 percent.
  - 2. Provide recesses in excavation bottom to receive bells of pipe bell ends. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.
  - 3. Apply and compact impervious fill material to raise low areas or where unsatisfactory bearing soil may occur.
- C. Use increases, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- D. Maintain swab or drag in piping with tight joints and pull past each joint as it is completed.
- E. Extend piping and connect to site storm drains, of sizes and in locations indicated. Terminate piping as indicated.

### **3.05 PIPE JOINT CONSTRUCTION AND INSTALLATION**

- A. General: Join and install pipe and fittings as indicated and according to the following.
- B. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: With rubber compression gaskets according to CISPI "Cast Iron Soil Pipe and Fittings Handbook," Volume I. Use gaskets that match class of pipe and fittings.
- C. Polyvinyl Chloride (PVC) Pipe and Fittings: As follows:
  - 1. Join ASTM D 3034 sewer pipe and fittings with elastomeric seal gaskets according to ASTM D 2321.
  - 2. Join ASTM D 2729 perforated, sewer pipe and fittings with loose, bell-and-spigot joints.
  - 3. Install according to ASTM D 2321.
  - 4. Install perforated pipe with perforation down.

- D. System Piping Joints: Make joints using system manufacturer's seals and couplings, except where otherwise specified.
- E. Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and that fit both pipe materials and dimensions.

### **3.06 SLEEVE INSTALLATION**

- A. Install sleeves in locations and at elevations indicated.

### **3.07 DRAINAGE CONDUIT INSTALLATION**

- A. Install according to manufacturer's written instructions and as indicated. Coordinate placement with other foundation drainage materials.
  - 1. Comply with manufacturer's written instructions for securing drainage conduits to substrate. Use adhesives and mechanical fasteners recommended by manufacturer. Protect installed conduits during backfilling.
  - 2. Do not use drainage conduits as protection over waterproof membrane, unless otherwise approved by waterproofing-membrane manufacturer.

### **3.08 SOIL MATERIAL INSTALLATION**

- A. Filter Fabric: Place filter fabric as detailed on drawings.
- B. Filtering Material: Place filtering material surrounding drainage pipe as detailed on the drawings.
- C. Drainage Fill: Place fill over drain piping after accessory testing and covering with filtering material and filter fabric. Cover piping to width of at least 6 inches on each side and above top of pipe to within 18 inches of finish grade. Place fill material in layers not exceeding 3 inches in loose depth, and compact each layer placed.
  - 1. Place 1 layer of synthetic drainage fabric, overlapping edges at least 4 inches, over drainage fill material.

### **3.09 FIELD QUALITY CONTROL**

- A. Testing: Test drain piping with water or visually check piping to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.
  - 1. Place additional filtering material to depth of 4 inches around sides and top of drains after testing.

**END OF SECTION**

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## **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 meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content.
  - 2. MR Credit 5 - Regional Materials.
  - 3. The contractor is expected to understand the LEED requirements for these credits 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 3514.01 - LEED Credit Summary
- B. Section 01 7419 - Construction Waste Management and Disposal
- C. Section 32 1313 - Concrete Paving
- D. Section 079005 - Joint Sealers: Sealants for saw cut joints and isolation joints in slabs.
- E. Section 07 1300 - Sheet Waterproofing

#### **1.03 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; 2022.
- N. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- O. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- P. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2021.
- Q. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2021a.
- R. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2020b.
- S. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- T. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.



- U. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- V. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
- W. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019.
- X. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2019.
- Y. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.
- Z. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- AA. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2021.
- BB. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.
- CC. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2020.
- DD. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 2011 (Reapproved 2022).
- EE. COE CRD-C 513 - COE Specifications for Rubber Waterstops; 1974.
- FF. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; 1974.
- GG. NSF 61 - Drinking Water System Components - Health Effects; 2020.

#### **1.04 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. Samples for Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.

- D. Verification Samples: Submit sample chips of specified colors indicating pigment numbers and required dosage rates, for subsequent comparison to installed concrete.
- E. Samples: Submit samples of underslab vapor retarder to be used.
- F. Test Reports: Submit report for each test or series of tests specified.
- G. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- 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 LEED 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. 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.
  3. Submit documentation for harvesting and manufacturing locations of all concrete and reinforcing steel intended for use on the project as may be required for proper documentation of MR Credit 5.
  4. Provide documentation for pre and post-consumer recycled content for all concrete and reinforcing steel intended for use as may be required for proper documentation of MR Credit 4.

## **1.05 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."

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

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

## **1.07 LEED REQUIREMENTS**

- A. 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
- B. Steel Reinforcing:
  - 1. All reinforcing steel shall be from manufacturer(s) who fabricate and manufacturer products within 500 miles of the project site. Provide documentation as outline in Part I of this specification.
  - 2. Contract shall endeavor to provide reinforcing steel with the highest percentages of pre and post-consumer recycled content readily available from manufacturer(s) who comply with requirements for regional materials listed above.
    - a. Minimum post-consumer recycled content = 85%
    - b. Minimum pre-consumer recycled content = 13%
- C. Concrete Materials:
  - 1. All concrete materials shall be from manufacturer(s) who fabricate and manufacturer products within 500 miles of the project site. Provide documentation as outline in Part I of this specification.
  - 2. Contract shall endeavor to provide concrete materials with the highest percentages of pre and post-consumer recycled content readily available from manufacturer(s) who comply with requirements for regional materials listed above.

## **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. Formulate form-release agent with rust inhibitor for steel form-facing materials.
  2. 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 MATERIALS**

- 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 C33/C33M.
  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: ASTM C1602/C1602M; clean, potable, 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:
    - 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 9e. 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
    - e. 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



- f. 0.0052 Perm Water Vapor Permeance Effect Low Temperature and Flexibility  
ASTM E-154, Section 12 ASTM E-96, Procedure B
- g. 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
- h.  $8.7 \times 10^{-9}$  Radon Transmittance (m/s) k124/02/95
- i.  $3.3 \times 10^{-12}$  Radon Coefficient (m<sup>2</sup>/s)
- 2. Install per manufacturer's recommendations.
- 3. Tape all joints and waterproof seal all penetrations.
- 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, white opaque, minimum nominal thickness of 4 mil, 0.004 inch (0.102 mm).
  - 2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard (1.71 kg/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. 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 Architect 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) unless noted otherwise on the drawings.
  - 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).
- 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. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.
- C. 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. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in accordance to bonding agent 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.
- D. 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.
- E. 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. 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 Architect 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.

**END OF SECTION**

## **SECTION 042000 - UNIT MASONRY**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Concrete block.
- B. Clay facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Lintels.
- G. Accessories.
- H. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. The contractor is expected to understand the LEED 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 3514.01 LEED-NC 2009 Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 04 7200 - Cast Stone Masonry
- D. Section 055000 - Metal Fabrications: Loose steel lintels.
- E. Section 072100 - Thermal Insulation: Insulation for cavity spaces.
- F. Section 07 6200 Sheet Metal Flashing and Trim
- G. Section 079200 - Joint Sealants: Sealing control and expansion joints.
- H. Section 07 6500 - Wall Flashing

### **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; 2022.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- F. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2017.
- G. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2021.
- H. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2017.
- I. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- J. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.
- K. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
- L. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2021.
- M. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- 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. See Section 01 3001 - Submittals for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
- F. LEED Submittals:
  - 1. Product data for Materials and Resources Credit 4: 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. Product data for Regional Materials Credit 5: For products using regional materials, documentation indicating percentages by weight that are extracted, processed, and manufactured within 500 miles of the project site.

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

- A. Construct a masonry 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.

#### **1.07 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. All concrete masonry units and clay masonry brick units shall be from manufacturer(s) who fabricate and manufacturer products within 500 miles of the project site. Provide documentation as outline in Part I of this specification.
- B. Contract shall endeavor to provide brick units with the highest percentages of pre and post-consumer recycled content readily available from manufacturer(s) who comply with requirements for regional materials listed above.
- C. Steel Reinforcing:
  1. All reinforcing steel shall be from manufacturer(s) who fabricate and manufacturer products within 500 miles of the project site. Provide documentation as outline in Part I of this specification.
  2. Contract shall endeavor to provide reinforcing steel with the highest percentages of pre and post-consumer recycled content readily available from manufacturer(s) who comply with requirements for regional materials listed above.
    - a. Minimum post-consumer recycled content = 85%
    - b. Minimum pre-consumer recycled content = 13%



## **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. 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 CMU at outside vertical corners. First course to be square edge to facilitate installation of specified wall base materials.

### **2.02 BRICK UNITS**

- A. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
  - 1. Color and texture to match Architect's sample.
  - 2. Color and texture: Shall be Equal to the brick found on surrounding buildings on base. Contractor to obtain Government's approval of brick selection prior to commencing order.
  - 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 the mortar installed on the adjacent buildings on base.

## **2.04 REINFORCEMENT AND ANCHORAGE**

- A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420) deformed billet bars; galvanized.
- B. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- C. Strap Anchors: Bent steel shapes, 1-1/2 inch (38 mm) width, 0.105 inch (2.7 mm) thick, 24 inch (610 mm) length, with 1-1/2 inch (38 mm) long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.
- 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 (4.8mm) side rods with 0.1875 inch (4.8mm) 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 spacead 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 (4.8mm) wire, width of components as required to provide not less than 5/8 inch (16 mm) of mortar coverage from eacah 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 less than 5/8 inch (16 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).
- H. Provide pre-formed corners and T reinforcing systems matching the requirements listed above at corners and intersections.

## **2.05 FLASHINGS**

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

## **2.06 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints. Field locate as required prior to installation. Control Joint spacing shall not exceed maximum spacing as indicated on structural drawings.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; maximum lengths available.
- C. 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.
- D. Mortar Net: Fluid conducting non-absorbent Polyester mesh 16" x 96" x 3/4". Use multiple layers at bottom of wall and above through wall flashing when air space depth exceeds masonry mat thickness by 3/8'.
- 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 MIXING**

- 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 Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).
- 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: Running.
  - 2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).

3. Mortar Joints: Concave.

### **3.05 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. 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 on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- 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.
  - 1. Install tube weeps in lieu of polypropylene weeps where top of wall conditions occurs in cast stone. Locate tube weep at bottom edge of stone unit and locate weep at all head joints.
- 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.

- D. Provide and install tube weeps in lieu of polypropylene weeps at cast stone application on top of through wall flashings, above shelf angles and lintels and at bottom of walls. Provide tube weeps at all head joints in cast stone veneer at locations described above and as indicated in the drawings.

### **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 - SINGLE WYTHER MASONRY**

- A. Install horizontal joint reinforcing 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).

### **3.09 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. Place continuous joint reinforcement in first joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and end of panels, so maximum spacing of anchors is 8 inches on center.

### **3.10 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. Place continuous joint reinforcement in first joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. 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.

### **3.11 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. Place continuous joint reinforcement in first joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. 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.

### **3.12 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. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.
- C. Lap end joints of flashings at least 6 inches (152 mm) and seal watertight with mastic or elastic sealant.
- D. Refer to Division 7 for flashing requirements.

### **3.13 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.



1. See structural drawings for CMU lintel size and reinforcing requirements.
- C. Maintain minimum bearing as called for on the drawings.

### **3.14 GROUTED COMPONENTS**

- A. Reinforce bond beams with reinforcement indicated on the structural drawings.
- 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 (300mm) either side of opening.

### **3.15 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

### **3.16 BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
  1. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.
- 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/C67M 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 compliance with 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 047200 - CAST STONE MASONRY**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Cast Stone: An architectural stone unit manufactured to copy fine grain texture and color of natural cut stone used in unit masonry applications. Meets ASTM C 1364 requirements.
- B. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. The contractor is expected to understand the LEED 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 3414.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 042000 - Unit Masonry: Installation of cast stone in conjunction with masonry.
- D. Section 07 6500 - Wall Flashing
- E. Section 079005 - Joint Sealers: Materials and execution methods for sealing soft joints in cast stone work.
- F. Section 07 6500 - Wall Flashing

#### **1.03 REFERENCE STANDARDS**

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- B. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- D. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

- E. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- F. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- G. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019.
- H. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2013.
- I. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- J. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2019.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.
- B. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.
- C. Product Data: Test results of cast stone components made previously by the manufacturer.
  - 1. Include one copy of ASTM C1364 for the Architect's use.
- D. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
  - 1. Provide Alabama licensed engineer's stamp on drawings.
  - 2. Reuse of Architect's drawings for shop drawings is not allowed.
  - 3. The cast stone manufacturer shall provide and be responsible for all cast stone engineering design including support connections, anchors, wall ties, internal reinforcement and method of attachment to building substrate / structural steel / metal stud framing, etc.
- E. Mortar Color Selection Samples. provide for the Government's and owner written approval.
- F. Verification Samples: Pieces of actual cast stone components not less than 12 inches (305 mm) square, illustrating range of color and texture to be anticipated in components furnished for the project.

1. Prior to ordering materials, the Contractor shall receive written approval of color selection from the Government.
- G. Sustainability Submittals, Product data for LEED 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
  2. Product data for Regional Materials Credit 5: For products using regional materials, documentation indicating percentages by weight that are extracted, processed, and manufactured within 500 miles of the project site.

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm with a minimum of 5 years of experience in producing cast stone of the types required for project.
1. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
  2. Products previously produced by plant and exposed to weather that exhibit satisfactory appearance.

### **1.06 MOCK-UP**

- A. Construct a masonry 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.

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

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Number each piece individually to match shop drawings and schedule.

- C. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- F. Store mortar materials where contamination can be avoided.
- G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

## **1.08 LEED 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.
    - a. Include statement indicating costs (sell price for each product having recycled content)
    - b. Include total weight of products provided
- B. All architectural cast stone shall be from manufacturer(s) who fabricate and manufacturer products within 500 miles of the project site. Provide documentation as outline in Part I of this specification.
- C. Contract shall endeavor to provide architectural cast stone with the highest percentages of pre and post-consumer recycled content readily available from manufacturer(s) who comply with requirements for regional materials listed above.

## **PART 2 PRODUCTS**

### **2.01 ARCHITECTURAL CAST STONE**

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural stone, complying with ASTM C90
  - 1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
  - 2. Freeze-Thaw Resistance: Demonstrated by field experience.



3. Surface Texture: Smooth, fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet (6 meters).
  4. Color: Selected by the Architect from manufacturer's full range.
- B. Units: As indicated on the drawings
1. Provide full bed depth (3- 5/8") units at exterior applications.
- C. Shapes: Provide shapes indicated on drawings.
1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch (3 mm) or length divided by 360, whichever is greater, but not more than 1/4 inch (6 mm).
  2. Unless otherwise indicated on drawings, provide:
    - a. Wash or slope of 1:12 on exterior horizontal surfaces.
    - b. Drips on projecting components, wherever possible.
    - c. Raised fillets at back of sills and at ends to be built in.
- D. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
- E. At main entry and fitness center entry, provide engineered cast stone assembly designed to support itself and the brick veneer above as indicated on the drawings.

## **2.02 MATERIALS**

- A. Portland Cement: ASTM C150/C150M.
1. For Units: Type I, color as required to match Owner and Architect 's sample.
  2. For Mortar: Type I or II, except Type III may be used in cold weather.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
- D. Pigments: ASTM C979, inorganic iron oxides; do not use carbon black.
- E. Admixtures: ASTM C494/C494M.
- F. Water: Potable.

- G. Reinforcing Bars: ASTM A615/A615M deformed bars, galvanized.
- H. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.
- I. Embedded Anchors, Dowels, and Inserts: standard building stone anchors commercially available in a non-corrosive materials such as zinc plated galvanized steel brass or stainless steel Type 302 or 304., of type and size as required for conditions.
- J. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A123M, of shapes and sizes as required for conditions.
- K. Mortar: Portland cement-lime, ASTM C 270 Type N ; do not use masonry cement.
- L. Sealant: As specified in Section 079005.
- M. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 INSTALLATION**

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 042000
- B. Mechanically anchor cast stone units indicated; set remainder in mortar.
- C. Setting:
  - 1. Drench cast stone components with clear, running water immediately before installation.
  - 2. Set units in a full bed of mortar unless otherwise indicated.
  - 3. Fill vertical joints with mortar.

4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
- D. Accessories: Provide mortar nets, weeps, flashing and other required accessories per Section 04 4000 Units Masonry and Section 07 6500 - Wall Flashing, in compliance with the Cast Stone Institute. [caststone.org](http://caststone.org)

### **3.03 TOLERANCES**

- A. Joints: Make all joints 3/8 inch (9.5 mm), except as otherwise detailed.
  1. Remove excess mortar from face of stone before pointing joints.
  2. Point joints with mortar in layers 3/8 inch (9.5 mm) thick and tool to a slight concave profile.
- B. Sealant Joints: Install sealants as specified in Section 079005.
- C. Installation Tolerances:
  1. Variation from Plumb: Not more than 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.
  2. Variation from Level: Not more than 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.
  3. Variation in Joint Width: Not more than 1/8 inch in 36 inches (3 mm in 900 mm) or 1/4 of nominal joint width, whichever is less.
  4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch (1.5 mm) difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

### **3.04 CLEANING**

- A. Clean completed exposed cast stone after mortar is thoroughly set and cured.
  1. Wet surfaces with water before applying cleaner.
  2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
  3. Remove cleaner promptly by rinsing thoroughly with clear water.
  4. Do not use acidic cleaners.

### **3.05 PROTECTION**

- A. Protect completed work from damage.

- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

**END OF SECTION**

## **SECTION 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 requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. EQ Credit 4.2: Low-Emitting Materials:
  - 4. The contractor is expected to understand the LEED 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 3414.01 - LEED Credit Summary
- B. Section 052100 - Steel Joist Framing.
- C. Section 053100 - Steel Decking: Support framing for small openings in deck.
- D. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.

#### **1.03 REFERENCE STANDARDS**

- A. AISC (MAN) - Steel Construction Manual; 2017.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- C. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- D. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- G. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.
- H. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- I. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2013 (Reapproved 2018).
- J. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- K. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- L. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.
- M. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021a.
- N. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- O. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding; 2018, with Editorial Revision (2019).
- P. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- Q. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).
- R. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2020.
- S. 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.
- T. 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.

- U. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.
- V. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).
- W. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.
- X. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.
- Y. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.
- Z. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners; 2013.
- AA. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- BB. 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. Submit the following documentation as required for LEED compliance:
  - 1. MR Credit 4: Recycled Content: Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product installed on site.

2. MR Credit 5: Regional Materials: Indicate distance from project site to (1) harvest/material extraction location (2) manufacturing location. Indicate percentage of the material harvested and manufactured within 500 miles of the project site.
3. EQ Credit 4.2: Low-Emitting Materials:
  - a. If shop priming and/or painting is provided under this specification section, submit manufacturer's product data indicating intended product's compliance with the requirement of LEED EQ Credit 4.2 for paints and coatings. Submit documentation from the paint manufacturer indicating that shop primed coatings are compatible with field applied topcoats specified in Section 09 99123 as applicable.

### **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: 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.

### **1.06 LEED REQUIREMENTS**

- A. Steel Shapes, Bars and Plates
  1. Wide flange and W shapes: ASTM A992 (Grade 50).
    - a. Recycled Materials: Wide flange steel products provided under this specification must meet or exceed the following recycled content thresholds. Submit product data substantiating recycled content as outlined in part 1.04 above.
      - 1) Minimum Post Consumer Recycled Content = 75%
      - 2) Minimum Pre-Consumer Recycled Content = 11%



2. Miscellaneous shapes, angles, channels, and plates: ASTM A36.
  - a. Recycled Materials: Wide flange steel products provided under this specification must meet or exceed the following recycled content thresholds. Submit product data substantiating recycled content as outlined in part 1.04 above.
    - 1) Minimum Post Consumer Recycled Content = 85%
    - 2) Minimum Pre-Consumer Recycled Content = 13%
- B. Structural Tubing, Cold-Formed: ASTM A 500, Grade B, yield 46,000 psi min.
  1. Recycled Materials: Wide flange steel products provided under this specification must meet or exceed the following recycled content thresholds. Submit product data substantiating recycled content as outlined in part 1.04 above.
    - a. Minimum Post Consumer Recycled Content = 85%
    - b. Minimum Pre-Consumer Recycled Content = 13%
- C. Steel Pipe: ASTM A 53.
  1. Type and grade: Type E or S, Grade B.
  2. Finish: Black.
  3. Recycled Materials: Wide flange steel products provided under this specification must meet or exceed the following recycled content thresholds. Submit product data substantiating recycled content as outlined in part 1.04 above.
    - a. Minimum Post Consumer Recycled Content = 85%
    - b. Minimum Pre-Consumer Recycled Content = 13%
- D. Regional Materials: All above listed steel products provided under this specification must be extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.04 above. Products not meeting this requirement will not be considered.

## **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. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.
- G. Steel Bars: ASTM A108.
- H. Steel Plate: ASTM A514/A514M.
- I. Steel Sheet: ASTM A1011/A1011M, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.
- J. Pipe: ASTM A53/A53M, Grade B, Finish black.
- K. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- L. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.
- M. Headed Anchor Rods: ASTM F 1554 Grade 36, plain.
- N. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at connections requiring high-strength bolts.
- O. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- P. 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.
- Q. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- R. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction and LEED Requirements.

## **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 303.
- 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 Architect.
- 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. Loose bearing members, such as plates or angles, and anchor bolts for site placement.
- C. Supplementary framing for floor and roof openings greater than 18 inches (450 mm).
- D. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. EQ Credit 4.2 - Low Emitting Materials.
  - 4. The contractor is expected to understand the LEED 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 3414.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Section 051200 - Structural Steel Framing: Superstructure framing.
- E. Section 053100 - Steel Decking: Support framing for openings less than 18 inches (450 mm) in decking.
- F. 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; 2004.
- M. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).
- N. SSPC-SP 2 - Hand Tool Cleaning; 2018.

#### **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.
- D. LEED Submittals

1. Submit documentation for harvesting and manufacturing locations of all steel joints intended for use on the project as may be required for proper documentation of MR Credit 5.
2. Provide documentation for pre and post-consumer recycled content for all steel joists intended for use as may be required for proper documentation of MR Credit 4.

### **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.

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

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

### **1.07 LEED REQUIREMENTS**

- A. Recycled Materials: Steel products provided under this specification must meet or exceed the following recycled content thresholds. Submit product data substantiating recycled content as outlined in part 1.4 above.
  1. Minimum Post Consumer Recycled Content = 75%
  2. Minimum Pre-Consumer Recycled Content = 10%
- B. Regional Materials: Steel products provided under this specification must be extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.4 above. Products not meeting this requirement will not be considered.

## **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. Anchor Bolts, Nuts and Washers: ASTM A307 hot-dip galvanized per ASTM A153/A153M Class C.
- C. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction, and applicable requirements of LEED EQ Credit 4.2.

## **2.02 FABRICATION**

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

## **2.03 FINISH**

- A. Shop prime joists as specified.
- B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

## **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. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.
- D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- E. Position and field weld joist chord extensions and wall attachments as detailed.
- F. Install supplementary framing for floor and roof openings greater than 8 inches (<math>\leq 203\text{ mm}</math>), unless shown otherwise on drawings.



- G. 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.
- H. Do not field cut or alter structural members without approval of joist manufacturer.
- I. 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:
    - a. Radiographic testing performed in accordance with ASTM E94.
    - b. Ultrasonic testing performed in accordance with ASTM E164.
    - c. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
    - d. Magnetic particle inspection performed in accordance with ASTM E709.

### **END OF SECTION**

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## **SECTION 053100 - STEEL DECKING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Roof deck.
- B. Floor deck.
- C. Supplementary framing for openings up to and including 18 inches (450 mm).
- D. Bearing plates and angles.
- E. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. EQ Credit 4.2 - Low Emitting Materials.
  - 4. The contractor is expected to understand the LEE 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 3414.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Section 033000 - Cast-in-Place Concrete: Concrete topping over metal deck.
- E. Section 04 2000 - Unit Masonry Assemblies: Placement of anchors for bearing plates embedded in unit masonry assemblies.
- F. Section 051200 - Structural Steel Framing: Support framing for openings larger than 18 inches (450 mm) and shear stud connectors.
- G. Section 052100 - Steel Joist Framing: Support framing for openings larger than 18 inches (450 mm) and shear stud connectors.
- H. 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 LEED Compliance:

1. Submit documentation for harvesting and manufacturing locations of all steel decking intended for use on the project as may be required for proper documentation of MR Credit 5.
2. Provide documentation for pre and post-consumer recycled content for all steel decking intended for use as may be required for proper documentation of MR Credit 4. 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 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.

### **1.06 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.

### **1.07 LEED REQUIREMENTS**

- A. Recycled Materials: Steel deck products provided under this specification must meet or exceed the following recycled content thresholds. Submit product data substantiating recycled content as outlined in part 1.04 above.
  1. Minimum Post Consumer Recycled Content = 58%
  2. Minimum Pre-Consumer Recycled Content = 8%
- B. Regional Materials: All steel products provided under this specification must be extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.04 above. Products not meeting this requirement will not be considered.

## 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.
- C. Non-Composite Floor Form Deck: Fluted steel sheet :
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
  - 2. Structural Properties:
    - a. Section modulus: as noted on drawings.
  - 3. Span Design: Double.
  - 4. ~~Minimum Base Metal Thickness: 26 gage, 26 inch (0.455 mm).~~ **Minimum Base Metal Thickness: 28 gage, 0.013 inch, 0.321mm. (Modified by Addendum No. 2)**
  - 5. Nominal Height: See drawings

6. Side Joints: Lock seam or nested
7. End Joints: Lapped, welded.
- D. Metal Form Deck: Corrugated sheet steel, with provision for ventilation of concrete:
  1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
    - a. Grade as required to meet performance criteria.
  2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
  3. Formed Sheet Width: 24 inch (600 mm).
  4. Side Joints: Lapped, welded.
  5. End Joints: Lapped, welded.

## **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, and applicable requirements of LEED EQ Credit 4.2 - Low Emitting Materials.
- 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 LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. EQ Credit 4.2 - Low Emitting Materials.
  - 4. The contractor is expected to understand the LEED 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 3514.01 - LEED-NC 2009 Credit Summary.
- B. Section 01 6000 - Product Requirements.
- C. Section 01 7419 - Construction Waste Management and Disposal.
- D. Section 04 2000 - Unit Masonry.
- E. Section 04 7200 - Cast Stone Masonry.
- F. Section 053100 - Steel Decking.
- G. Section 061000 - Rough Carpentry: Wood blocking and miscellaneous framing.
- H. Section 072500 - Weather Barriers: Weather barrier over sheathing.
- I. Section 079005 - Joint Sealers.
- J. Section 092116 - Gypsum Board Assemblies: Gypsum-based sheathing.

### **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.
- F. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

### **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. Design data:
  - 4. Provide details and calculations for factory-made framing connectors.
- D. Sustainability Submittals, Product data for LEED Compliance:

1. Submit documentation for harvesting and manufacturing locations of all metal framing members intended for use on the project as may be required for proper documentation of MR Credit 5.
2. Provide documentation for pre and post-consumer recycled content for all metal framing members intended for use as may be required for proper documentation of MR Credit 4.

#### **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

#### **1.07 MOCK-UP**

- A. Construct a masonry 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 LEED REQUIREMENTS**

- A. Recycled Materials: Steel framing products provided under this specification must meet or exceed the following recycled content thresholds. Submit product data substantiating recycled content as outlined in part 1.4 above.
  1. Minimum Post Consumer Recycled Content = 58%
  2. Minimum Pre-Consumer Recycled Content = 8%
- B. Regional Materials: All steel products provided under this specification must be extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.04 above. Products not meeting this requirement will not be considered.

## **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. Design Requirements: Provide completed framing system having the following characteristics:
  - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
  - 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
  - 3. Design Loads: As indicated on the drawings.
  - 4. Live load deflection meeting the following, unless otherwise indicated:
  - 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
  - 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- C. Shop fabricate framing system to the greatest extent possible.
- D. Deliver to site in largest practical sections.

### **2.02 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. Gauge and depth: As indicated on the drawings.
- B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
  - 1. Base Metal: As required to meet specified performance levels within maximum depths indicated.
  - 2. Gage and Depth: As indicated on drawings.

- C. 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.
- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction, and applicable requirements of LEED EQ Credit 4.2

## **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. Coordinate installation of sealant with floor and ceiling tracks.
- C. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- D. Install load bearing studs full length in one piece. Splicing of studs is not permitted.
- E. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- F. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- G. Install intermediate studs above and below openings to align with wall stud spacing.
- H. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- I. Attach cross studs to studs for attachment of fixtures anchored to walls.
- J. Install framing between studs for attachment of mechanical and electrical items, and bridging to prevent stud rotation and buckling.
- K. 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.
- C. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.
- D. Provide web stiffeners at reaction points.
- E. Touch-up field welds and damaged galvanized surfaces with primer.



**3.04 WALL SHEATHING (GYPSUM SHEATHING)**

- A. Install wall sheathing 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 with foam insulation or gypsum board wall sheathing.

**END OF SECTION**

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## **SECTION 054400 - COLD-FORMED METAL TRUSSES**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Light gage cold-formed steel roof trusses.
- B. Anchorages, bracing, and bridging.
- C. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. The contractor is expected to understand the LEED 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 054000 - Cold-Formed Metal Framing: Light gage structural metal studs, joists, and rafters.
- B. Section 061000 - Rough Carpentry: Floor and roof sheathing.
- C. Section 01 3414.01 - LEED Credit Summary
- D. Section 01 7419 - Construction Waste Management and Disposal

#### **1.03 REFERENCE STANDARDS**

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.
- 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 A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- D. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

F. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.

G. CFSEI 5000 - Field Installation Guide for Cold-Formed Steel Roof Trusses; May 2000.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

A. Pre-Installation Meeting: Meet at project site prior to beginning of installation to review requirements. Require attendance by representatives of the following:

1. Truss fabricator.
2. Truss installer.
3. Other entities affected by the work of this section, including but not limited to truss support framing installer, mechanical systems installer, and electrical systems installer.

#### **1.05 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. Span charts.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings:

1. Show member type, location, spacing, size and gage, methods of attachment, and erection details. Indicate supplemental bracing, strapping, splices, bridging, and accessories.
2. Include truss design drawings, signed and sealed by a qualified professional engineer registered in the State in which the Project is located, verifying ability of each truss design to meet applicable code and design requirements.
  - a. Include the following:
    - 1) Design criteria.
    - 2) Engineering analysis depicting member stresses and deflections.
    - 3) Member sizes and gages.
    - 4) Details of connections at truss joints.

- 5) Truss support reactions.
- 6) Bracing requirements.
- D. Sustainability Submittals, Product data for LEED Compliance:
  - 1. Submit documentation for harvesting and manufacturing locations of all cold-formed metal trusses intended for use on the project as may be required for proper documentation of MR Credit 5.
  - 2. Provide documentation for pre and post-consumer recycled content for all cold-formed metal trusses intended for use as may be required for proper documentation of MR Credit 4.

## **1.06 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Steel truss fabricator with minimum 10 years of experience designing and fabricating truss systems equivalent to those required for this project and licensed by an acceptable manufacturer.
- B. Installer Qualifications: Experienced installer approved by truss system fabricator.
- C. Welders: Qualify welding processes and welding operators in accordance with AWS B2.1/B2.1M.

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

- A. Deliver trusses and other materials in manufacturer's unopened bundles or containers, each marked with manufacturer's name, brand, type, and grade. Exercise care to avoid damage during unloading, storing, and erection.
- B. Store trusses on blocking, pallets, platforms, or other supports, off the ground and in an upright position, sufficiently braced to avoid damage from excessive bending. Gently slope stored trusses to avoid accumulation of water on interior of truss chord members.
- C. Protect trusses and accessories from contact with earth, corrosion, deformation, mechanical damage, or other deterioration when stored at project site.

## **1.08 LEED REQUIREMENTS**

- A. Recycled Materials: Steel products provided under this specification must meet or exceed the following recycled content thresholds. Submit product data substantiating recycled content as outlined in part 1.4 above.
  - 1. Minimum Post Consumer Recycled Content = 58%
  - 2. Minimum Pre-Consumer Recycled Content = 8%

- B. Regional Materials: Steel products provided under this specification must be extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.4 above. Products not meeting this requirement will not be considered

## **PART 2 PRODUCTS**

### **2.01 TRUSS DESIGN REQUIREMENTS**

- A. Design: Calculate structural characteristics of cold-formed steel truss members according to AISI S100-12.
- B. Structural Performance: Design, engineer (licensed in the State of Alabama), fabricate, and erect trusses to withstand specified design loads for project conditions within required limits. Provide engineers signed Alabama seal on all drawings.
  - 1. Design Loads & Deflection Limits: As indicated on the drawings.
  - 2. Design trusses to accommodate movement attributable to temperature changes within a range of 120 degrees F (67 degrees C) without damage or overstressing, sheathing failure, undue strain on fasteners and anchors, or other deleterious effects.

### **2.02 COMPONENTS**

- A. Trusses: Light gage steel assemblies providing a complete horizontal framing system for locations indicated, ready for deck installation.
  - 1. Truss Type, Span, and Height: As indicated on drawings.
  - 2. Chord and Web Members: Fabricate required shapes from commercial quality galvanized steel sheet complying with ASTM A653/A653M, with minimum yield strength of 40,000 psi (275 MPa); minimum G60/Z180 coating; gages as required for load conditions except T&B chords shall be 16 gage min. and web members shall be 18 gage min.; all edges rolled or closed.
    - a. Coordinate truss design with all loads including load imposed by suspended security inspection platform system - see drawings.
    - b. Provide top chords with 2" minimum width.
- B. Bracing, Bridging, and Blocking Members: Fabricate required shapes from commercial quality galvanized steel sheet complying with ASTM A653/A653M, with minimum yield strength of 33,000 psi (230 MPa); minimum G60/Z180 coating; gages as required for load conditions.

## **2.03 FABRICATION**

- A. Factory fabricate cold-formed steel trusses plumb, square, true to line, and with secure connections, complying with manufacturer's recommendations and project requirements.
  - 1. Fabricate trusses using jig templates.
  - 2. Cut truss members by sawing, shearing, or plasma cutting.
  - 3. Fasten members in full compliance with instructions of manufacturer. Wire tying of framing members is not permitted.
- B. Tolerances: Fabricate trusses to maximum allowable tolerance variation from plumb, level and true line of 1/8 inch in 10 feet (1:1000).
  - 1. Up to 30 feet (9 m) Long: Maximum plus or minus 1/2 inch (12 mm) from design length.
  - 2. Over 30 feet (9 m) Long: Maximum plus or minus 3/4 inch (19 mm) from design length.
  - 3. Up to 5 feet (1.5 m) High: Maximum plus or minus 1/4 inch (6 mm) from design height.
  - 4. Over 5 feet (1.5 m) High: Maximum plus or minus 1/2 inch (12 mm) from design height.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine structure, substrates, and installation conditions. Notify the Architect of unsatisfactory preparation. Do not begin installation until substrates have been properly prepared and unsatisfactory conditions have been corrected.
- B. Proceeding with installation indicates installer's acceptance of substrate conditions.

### **3.02 INSTALLATION**

- A. Install cold-formed steel trusses in strict accordance with manufacturer's instructions and approved shop drawings, using approved fastening methods.
- B. Install temporary erection bracing and permanent bracing and bridging before application of any loads. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at spacing indicated. Anchor trusses securely at bearing points.

- C. Adequately distribute applied loads to avoid exceeding the carrying capacity of any one joint, truss, or other component.
- D. Exercise care to avoid damaging truss members during lifting and erection and to minimize horizontal bending of trusses.
- E. Removal, cutting, or alteration of any truss chord, web, or bracing member in the field is prohibited, unless approved in advance by the Architect or the engineer of record and the truss manufacturer.
- F. Repair or replace damaged members and complete trusses as directed and approved in writing by the Architect or the engineer of record and the truss manufacturer.
- G. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.
- H. Field Welding: In accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M, as applicable, and as follows:
  - 1. Connections: Provide fillet, flat, plug, or butt welds, as indicated.
  - 2. Minimum steel thickness for welded connections, 18 gage, 0.0478 inch (1.21 mm).
- I. Roof Trusses:
  - 1. Comply with recommendations of CFSEI 5000.
  - 2. Install continuous bridging and permanent truss bracing as indicated.
  - 3. Install roof cross bracing and diagonal bracing as indicated.

### **3.03 TOLERANCES**

- A. Install trusses to maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:1000).
- B. Space individual trusses not more than plus or minus 1/8 inch (3.2 mm) from plan location. Cumulative error in placement may not exceed minimum fastening requirements of sheathing or other material fastened to trusses.

### **3.04 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing in accordance with Section 014000 - Quality Requirements.
- B. The Contractor will provide inspection service for inspection of field connections, in accordance with requirements of Section 014000-Quality Requirements.



### **3.05 PROTECTION**

- A. Protect trusses from damage by subsequent construction activities.
- B. Repair or replace damaged trusses, truss members, and bracing members; obtain approval in advance by the Architect or the engineer of record and the truss manufacturer for all cutting, repairs, and replacements.

**END OF SECTION**

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## **SECTION 055000 - METAL FABRICATIONS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Shop fabricated steel items.
- B. Downspout boots.
- C. Alternating Tread Device
- D. Mechanical Screen Wall Gate (Bid Option)
- E. Stair Nosings
- F. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. EQ Credit 4.2 - Low Emitting Materials.
  - 4. The contractor is expected to understand the LEED 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 2300 - Bid Options
- B. Section 01 3514.01 LEED-NC 2009 Credit Summary
- C. Section 01 6000 - Product Requirements
- D. 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 055100 - Metal Stairs.
- H. Section 055213 - Pipe and Tube Railings.
- I. Section 06 2000 - Finish Carpentry

J. Section 099113 - Exterior 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 A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- H. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021a.
- J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- K. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- L. 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.
- M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- O. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

#### **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 LEED Compliance:
  - 1. Submit documentation for harvesting and manufacturing locations of all cold-formed metal trusses intended for use on the project as may be required for proper documentation of MR Credit 5.
  - 2. Provide documentation for pre and post-consumer recycled content for all cold-formed metal trusses intended for use as may be required for proper documentation of MR Credit 4.

#### **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 LEED 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, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
- B. Contractor shall endeavor to provide materials extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.04 above.

## **PART 2 PRODUCTS**

### **2.01 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 and applicable requirements of LEED EQ Credit 4.2 - Low Emitting Materials.

## **2.02 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.

### **2.03 FABRICATED ITEMS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Lintels: As detailed; galvanized finish.
- C. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.
- D. Extruded Nosings and Treads:
  - 1. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions. Provide extruded-aluminum units with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder.
    - a. Provide ribbed units, with abrasive filler strips projecting 1/16 inch (1.5 mm) above aluminum extrusion.
  - 2. Configurations: Provide units in the following configurations, unless otherwise indicated:
    - a. Nosings: Units, 3 inches (75 mm) wide, for casting into new concrete steps.
  - 3. Provide anchors for embedding units in concrete, as standard with manufacturer.
  - 4. Drill for mechanical anchors and countersink. Locate not more than 4 inches (100 mm) from ends and not more than 12 inches (300 mm) o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.
  - 5. Apply clear lacquer to concealed bottoms, sides, and edges of units set into concrete.



## **2.04 DOWNSPOUT BOOTS**

- A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
  - 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. Color: To be selected by the Contracting Officer from manufacturer's standard range.
  - 4. Coordinate with Civil storm pipe size and Downspout size.

## **2.05 ALTERNATING TREAD DEVICE**

- A. Manufactured Walk Thru Aluminum Alternating tread ladder complete with mounting brackets and handrails both sides.
  - 1. 1000 lbs. minimum capacity
  - 2. 3" side stringers x 2" x 1/8" extruded aluminum 6005-T5 aluminum flat bar, ceter stringer 10" x 1/4" extruded 6005-T5 aluminum flat bar with neoprene trim at front edge, pitch 68 degrees
  - 3. 2' - 4" wide
  - 4. Ladder treads: 1" aluminum bar grating 9 13/16" deep x 11 7/8" wide
  - 5. Ladder Mounting Brackets: 5" x 1 1/4" aluminum flat bar
  - 6. Handrails: 1 1/4" schedule 40 - 6005 T-5 Aluminum Pipe with internal aluminum fittings
- B. Field verify dimensions and conditions prior to fabrication.
- C. Submit shop drawings for approval.
- D. Install per manufacturers recommendations, provide all fasteners.

## **2.06 MECHANICAL SCREEN (BID OPTION)**

- A. Electro-Forged Galvanized steel fixed louver.
  - 1. 1-31/32 inch by 1/16 inch main bar
  - 2. 5/32 inch round cross bar forming a 13/16 inch by 5-7/32 inch mesh
  - 3. ASTM 132 Galvanized and Powder Polyester Coated
  - 4. Color: As selected from manufacturer's full range of colors.
  - 5. Install in accordance with manufacturer's written instructions.
  - 6. Accessories:
    - a. Provide hinges, flush bolts, hasps, and other accessories required for a complete installation.
    - b. Refer to drawings for additional information/requirements

## **2.07 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.

## **2.08 FINISHES - STEEL**

- A. Prime paint steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and where field welding is required.
  - 2. Ensure compliance with applicable portions of LEED EQ Credit 4.2 - Low Emitting Materials
- 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.

## **2.09 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**

### **3.01 EXAMINATION**

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

### **3.02 PREPARATION**

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

### **3.03 INSTALLATION**

- 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.

### **3.04 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**

## **SECTION 055213 - PIPE AND TUBE RAILINGS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Wall mounted handrails.
- B. Railings and guardrails.
- C. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. EQ Credit 4.2 - Low Emitting Materials
  - 4. The contractor is expected to understand the LEED 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 3414.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Section 033000 - Cast-in-Place Concrete: Placement of anchors in concrete.
- E. Section 042000 - Unit Masonry: Placement of anchors in masonry.
- F. Section 092116 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.
- G. Section 099113 - Exterior Painting: Paint finish.
- H. Section 099123 - Interior Painting: Paint finish.

#### **1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

- B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021a.
- C. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2020.
- D. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications; 2020.
- E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.
- F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- G. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2018.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
- C. LEED Submittals
  - 1. Submit documentation for harvesting and manufacturing locations of all metal framing members intended for use on the project as may be required for proper documentation of MR Credit 5.
  - 2. Provide documentation for pre and post-consumer recycled content for all metal framing members intended for use as may be required for proper documentation of MR Credit 4.

#### **1.05 QUALITY ASSURANCE**

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Fabricator Qualifications:
  - 1. A company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

## **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, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
- B. Contractor shall endeavor to provide materials extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.04 above.

## **PART 2 PRODUCTS**

### **2.01 RAILINGS - GENERAL REQUIREMENTS**

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot (1095 N/m) applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds (890 N) applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
  - 1. Top Rails and Wall Rails: 1-1/2 inches (38 mm) diameter, round.
  - 2. Intermediate Rails: 1-1/2 inches (38 mm) diameter, round.
  - 3. Posts: 1-1/2 inches (38 mm) diameter, round.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
  - 1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.

2. For anchorage to stud walls, provide concealed wood blocking.
  3. Posts: Provide adjustable flanged brackets.
- G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

## **2.02 STEEL RAILING SYSTEM**

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- C. Exposed Fasteners: No exposed bolts or screws.
- D. Straight Splice Connectors: Steel concealed spigots.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction and applicable requirements of LEED EQ Credit 4.2 - Low Emitting Materials.

## **2.03 FABRICATION**

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



## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 PREPARATION**

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

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, 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**

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## **SECTION 061000 - ROUGH CARPENTRY**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Non-structural dimension lumber framing.
- B. Concealed blocking for miscellaneous items.
- C. Subflooring.
- D. Roof-mounted curbs.
- E. Roofing nailers.
- F. Preservative treated wood materials.
- G. Concealed wood blocking, nailers, and supports.
- H. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 2 - Construction Waste Management
  - 2. MR Credit 5 - Regional materials.
  - 3. The contractor is expected to understand the LEED 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 3414.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 055000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.
- F. Section 072500 - Weather Barriers: Air barrier over sheathing.
- G. Section 076200 - Sheet Metal Flashing and Trim: Sill flashings.
- H. 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. AWP A 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 LEED Compliance:
  - 1. For products having Biologically Based Products, documentation indicating percentages of Biologically-Based Products
  - 2. For products containing VOCs, documentation (material safety data sheets (MSDS), third-party certificates, or test reports) showing printed statement of VOC content.
  - 3. MR Credit 5: Regional Materials: Indicate distance from project site to (1) harvest/material extraction location (2) manufacturing location. Indicate percentage of the material harvested and manufactured within 500 miles of the project site.

### **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 LEED REQUIREMENTS**

- A. 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
- B. Contractor shall endeavor to provide materials with the lowest possible VOC content.
- C. Regional Materials: All products provided under this specification must be extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.04 above. Products not meeting this requirement will not be considered.

## **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 fabricated from old growth timber is not permitted.
- C. Provide wood harvested within a 500 mile (805 km) radius of the project site.
- D. 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 & Ceiling Sheathing: Plywood, PSI, Grade C-D, Exposure 1, 5/8 inch 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 AWWA 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 AWWA standards.
- B. Fire Retardant Treatment:

1. Interior Type A: AWP A 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: AWP A 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: AWP A 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 metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. In walls, provide concealed blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. 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, and applicable requirements of LEED MR Credit 2 - Construction Waste Management.
  - 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**

## **SECTION 064100 - ARCHITECTURAL WOOD CASEWORK**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Cabinet hardware.
- B. Plastic Laminate Casework
- C. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 2 - Construction Waste Management
  - 2. MR Credit 5 - Regional materials.
  - 3. EQ Credit 4.2 - Low Emitting Materials
  - 4. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- F. Section 12 3600 - Countertops

#### **1.03 REFERENCE STANDARDS**

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- C. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).

- D. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber; Federal Specifications and Standards; Revision A, 1996.
- E. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

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

#### **1.05 SUBMITTALS**

- A. See Section 01 3001 - Submittals, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot (1:8).
- C. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- D. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- E. 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. MR Credit 5: Regional Materials: Indicate distance from project site to (1) harvest/material extraction location (2) manufacturing location. Indicate percentage of the material harvested and manufactured within 500 miles of the project site.

#### **1.06 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  - 1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.

### **1.07 MOCK-UP**

- A. Provide full size mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
- B. Mock up may remain as part of the Finished work once accepted by the Government

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

- A. Protect units from moisture damage.

### **1.09 FIELD CONDITIONS**

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

### **1.10 WARRANTY**

- A. 10 year written warranty on all products in this section for full replacement due to failure.

### **1.11 MANUFACTURER QUALIFICATION**

- A. Reputable manufacturer with documented experience manufacturing cabinets of equal size, quantity, scope, and quality for a period of not less than 5 years.

### **1.12 LEED REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with the lowest possible VOC content.
- B. Regional Materials: All products provided under this specification must be extracted, harvested, and manufactured within 500 miles of the project site. Submit product data substantiating extraction, harvesting, and manufacturing locations as outlined in part 1.04 above. Products not meeting this requirement will not be considered.

## **PART 2 PRODUCTS**

### **2.01 CABINETS**

- A. Plastic Laminate Faced Cabinets: Custom grade.
- B. Cabinets as indicated on drawings:
  - 1. Finish - Exposed Exterior Surfaces: Decorative laminate.
  - 2. Finish - Exposed Interior Surfaces: Decorative laminate.
  - 3. Finish - Concealed Surfaces: Manufacturer's option.

4. Door edges, Drawer edges, Front of cabinet edges, Shelves edges, and Cabinet Face Profiles: 3 mm thick, factory adhered.
5. Casework Construction Type: Type A - Frameless.
6. Interface Style for Cabinet and Door: Style 1 - Overlay; reveal overlay.
7. Cabinet Design Series: As indicated on drawings.
8. Adjustable Shelf Loading: 50 lbs. per sq. ft..
  - a. Deflection: L/144.
9. Cabinet Doors and Drawer Fronts: Flush style.
10. Drawer Side Construction: Doweled or dovetail sides ,sub fronts, and backs together.
11. Refer to finish schedule on the drawings for color selection.

## **2.02 LAMINATE MATERIALS**

- A. Thermally Fused Laminate (TFL): NEMA LD 3, Type VGL laminate panels.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as scheduled.
  1. Horizontal Surfaces: HGS, 0.048 inch (1.22 mm) nominal thickness, colors as scheduled, finish as scheduled.
  2. Vertical Surfaces: VGS, 0.028 inch (0.71 mm) nominal thickness, colors as scheduled, finish as scheduled.
  3. Cabinet Liner: CLS, 0.020 inch (0.51 mm) nominal thickness, through color, colors as scheduled, finish as scheduled.
  4. Laminate Backer: BKL, 0.020 inch (0.51 mm) nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

## **2.03 COUNTERTOPS**

- A. Quartz Countertops - Refer to Section 12 3600.

## **2.04 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Banding: Extruded PVC, flat shaped; smooth finish; self-locking serrated tongue; of width to match component thickness.
  - 1. Color: As selected by the Government from manufacturer's standard range (the intent is to match the adjoining plastic laminate as closely as possible).
  - 2. Use at 3mm at all cabinet faces, doors, drawer fronts, and exposed edges.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- D. Concealed Joint Fasteners: Threaded steel.
- E. Grommets: Stainless steel grommets for cut-outs. For bidding purposes, calculate at least one per individual work surface unless noted otherwise. The actual locations must be approved by the Government.
- F. Counter top bracket supports: Painted steel, per manufactures standard, comply with ADA

## **2.05 HARDWARE**

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch (25 mm) spacing adjustments.
- C. Drawer and Door Pulls: "U" shaped wire pull, stainless steel satin finish, 4 inch centers ("U" shaped wire pull, steel with chrome finish, 100 mm centers).
- D. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with chrome finish.
- E. Drawer Slides:
  - 1. Type: Full extension.
  - 2. Static Load Capacity: Commercial grade.
  - 3. Mounting: Side mounted.

- 4. Stops: Integral type.
- 5. Features: Provide self closing / soft close / stay closed type. (provide actual guide in mock up cabinet)
- F. Hinges: five knuckle grade 1, 270 degrees - stainless steel satin finish , ( provide actual hinge in cabinet mock up), provide manufactures recommended screws in all hinge screw holes.
- G. Door Catches: Nylon roller spring catch, dual or self aligning.

## **2.06 FABRICATION**

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet (600 mm) from sink cut-outs.
  - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- E. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Seal cut edges.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 INSTALLATION**

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.



- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (1 mm). Do not use additional overlay trim for this purpose.
- E. Secure cabinets to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

### **3.03 ADJUSTING**

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

### **3.04 CLEANING**

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

### **END OF SECTION**

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## **SECTION 068316 - FIBERGLASS REINFORCED PANELING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Fiberglass reinforced plastic (FRP) panels.
- B. Trim.
  - 1. Provide trim components at all perimeter and inside corners.
- C. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. EQ Credit 4.2 Low Emitting Materials
  - 2. The contractor is expected to understand the LEED 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 SECTIONS**

- A. Section 01 3514.01 - LEED Credit Summary
- B. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- C. Section 095100 - Acoustical Ceilings: Ceiling suspension system.
- D. Section 092116 - Gypsum Board Assemblies

#### **1.03 REFERENCE STANDARDS**

- A. 9 CFR 416.2 - Regulatory Requirements Under the Federal Meat Inspection Act and the Poultry Products Inspection Act, Part 416-Sanitation; current edition.
- B. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).
- C. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor; 2013a.
- D. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- E. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2017.

- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- G. ISO 846 - Plastics - Evaluation of the action of microorganisms; 2019.
- H. ISO 2812-1 - Paints and varnishes -- Determination of resistance to liquids -- Part 1: Immersion in liquids other than water; 2017.

#### **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. Samples: Submit two samples 6 inches by 6 inches (152 by 152 mm) in size illustrating material and surface design of panels.
- D. Maintenance Materials: Furnish the following for the Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Panels: Quantity equal to 5 percent of total installed.
- E. Sustainability Submittals, Product data for LEED 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.

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

- A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

#### **1.06 LEED 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 PANEL SYSTEMS**

**A. Wall Panels:**

1. Panel Size: 4 by 8 feet (1.2 by 2.4 m).
2. Panel Thickness: 0.10 inch (2.5 mm).
3. Surface Design: Smooth.
4. Color: White.
5. Attachment Method: Mechanical fasteners concealed by trim, with sealant in joints.

### **2.02 MATERIALS**

**A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.**

1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Scratch Resistance: Barcol hardness score greater than 35, when tested in accordance with ASTM D2583.
4. Impact Strength: Greater than 6 ft lb force per inch (320 J per m), when tested in accordance with ASTM D256.
5. Sanitation and Cleanability: Comply with 9 CFR 416.2.

**B. Trim: Vinyl; color matching panels**

**C. Fasteners: manufacturers recommended.**

**D. Adhesive: Type recommended by panel manufacturer.**

**E. Sealant: Type recommended by panel manufacturer; white.**

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section.

### **3.02 INSTALLATION - WALLS**

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.
- C. Pre-drill fastener holes in panels, 1/8 inch (3.2 mm) greater in diameter than fastener, spaced as indicated by panel manufacturer.
- D. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- E. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- F. Install panels with manufacturer's recommended gap for panel field and corner joints.
- G. Drive fasteners to provide snug fit, and do not over-tighten.
- H. Place trim on panel before fastening edges, as required.
- I. Fill channels in trim with sealant before attaching to panel.
- J. Install trim with adhesive and screws or nails, as required.
- K. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
- L. Remove excess sealant after paneling is installed and prior to curing.

**END OF SECTION**

**SECTION 070100 - SPECIAL PROJECT ROOFING WARRANTY**

**PROJECT GENERAL CONTRACTOR'S ROOFING WARRANTY**

**NAME OF PROJECT:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**GENERAL CONTRACTOR:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

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

- A. The Roofing, Aluminum Faced Composite Wall Panel, Metal Wall Panel, & Metal Soffit 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, Aluminum Faced Composite Wall Panel, Metal Wall Panel, & Metal Soffit Panel Contractor and General Contractor do hereby guarantee the roofing, wall panels, soffit panels, and metal flashing 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 Government 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

Note: Provide separate warranty for each Subcontractor if metal roof panel, aluminum faced composite wall panel, metal wall panel, and metal soffit panels, and metal flashing 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 concrete masonry walls of a minimum of three inches.
- B. Sound batt insulation for filling interior metal stud walls from floor to structure above.
  - 1. Wire ties for holding batt insulation in place.
- C. Batt insulation for installation above acoustical lay in tile ceiling systems.
- D. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. EQ Credit 4.2 - Low-Emitting Materials
  - 2. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 04 2000 - Unit Masonry
- F. Section 061000 - Rough Carpentry: Supporting construction for batt insulation.
- G. Section 07 2119 Spray Foam Insulation
- H. Section 09 2116 - Gypsum Board Assemblies:

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).

- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2021.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- F. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C; 2019a.
- G. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- H. 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. Sustainability Submittals, Product data for LEED 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. Included 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. VOC Content Limitations: For the specified products, submit documentation of conformance with Specification Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

## **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.
- B. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.
  1. See Part 2 of this specification section for specific biobased content thresholds, if applicable.
- C. 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.
- D. Contractor shall endeavor to provide materials with the lowest possible VOC content.

## **PART 2 PRODUCTS**

### **2.01 GENERAL CONDITIONS**

### **2.02 APPLICATIONS**

- A. Insulation Inside Exterior Masonry Cavity Walls Assemblies: Extruded polystyrene board.
- B. Insulation in Interior Metal Framed Walls: Batt insulation with no vapor retarder.

### **2.03 FOAM BOARD INSULATION MATERIALS**

1. Board Size as required to coordinate with specified masonry anchor spacings.
2. Board Thickness: 3 inches (76 mm)
3. Board Edges: Square.
4. Board Density: 1.6 lb/cu ft (26 kg/cu m).

5. Minimum compressive strength: 25 PSI, ASTM D1621
6. Sustainability Requirements:
  - a. Minimum Biobased content per USDA: 7%
  - b. Minimum Recycled Content: Total Recovered Materials: 9%

## **2.04 SOUND BATT INSULATION MATERIALS**

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; Type 1, friction fit.
  1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  4. Provide in **all** interior metal stud walls continuous from floor to structure above unless specifically noted otherwise to provide insulated envelope for sound isolation.
  5. Thickness of batts to be same nominal dimension as the metal stud width that it is installed in.
  6. Provide in thicknesses as required to fill stud widths.
  7. Sustainability Requirements:
    - a. Minimum Biobased content per USDA: 25%
    - b. Minimum Recycled Content: Total Recovered Materials: 25%
- B. Flexible Fiber Glass Insulation
  1. Application: For use above acoustical lay in tile ceilings. Refer to specification section 09 5100 for installation requirements. All batt insulation installed above lay in tile ceilings shall be cut to fit individual ceiling tiles and adhered to the ceiling tile units.
  2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  3. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
  4. Meets UL 181 Air Erosion Test requirements and can be used in return air plenums for air velocities up to 1,000 fpm.

5. Thickness: 3-1/2 inches, minimum.
6. Sustainability Requirements:
  - a. Minimum Recycled Content: Total Recovered Materials: 55%

## **2.05 ACCESSORIES**

- A. Wire Ties:
  1. Provide wire ties as required to hold sound batt insulation in place where gypsum wall board or other materials are not present on both sides of wall assembly.
- B. Adhesive: Type recommended by insulation manufacturer for application.

## **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 and adhesive.
- 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, Z clips, and other components .
- 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 air 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 BATT INSTALLATION**

- A. Install insulation in accordance with manufacturer's instructions.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- D. Install wire ties to hold insulation batts in place where - refer to 2.04.
- E. Install as required to achieve specified STC ratings where applicable.

### **3.04 PROTECTION**

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

### **END OF SECTION**



## SECTION 072119 - SPRAY FOAM INSULATION

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Foamed-in-place insulation.
- B. At junctions of dissimilar wall and roof materials and in exterior soffit and fascia conditions provide **closed cell spray foam insulation of R value not less than R-25** and coat as required by applicable codes with protective intumescent coating. Comply with all applicable codes for flame spread and smoke development index.
- C. Other locations as indicated on the drawings and as required where indications are not shown provide complete insulated envelope.
- D. Protective intumescent coating.
- E. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. EQ Credit 4.2 - Low-Emitting Materials
  - 2. MR Credit 4 - Recycled Content
  - 3. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- D. Section 05 3100 - Metal Decking
- E. Section 05 4000 - Cold Form Metal Framing
- F. Section 06 1000 - Rough Carpentry
- G. Section 07 2550 - Weather Barriers
- H. Section 07 4213 - Metal Soffit Panels
- I. Section 09 2116 - Gypsum Board Assemblies.

### **1.03 REFERENCE STANDARDS**

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2004
- B. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation; 2009.
- C. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2010.
- D. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2008.
- E. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- H. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

### **1.05 SUBMITTALS**

- A. See Section 01 3001 - Submittals for submittal procedures.
- B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.
- C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.
- D. Certificates: Certify that products of this section meet or exceed specified requirements.
- E. Provide written verification from manufacturer for intended use and compatibility with all adjacent materials to include, metal studs, gypsum board, exterior sheathing, and weather barrier.

**F. Sustainability Submittals, Product data for LEED 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
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. 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 products of the type specified in this section, with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience.

**1.07 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for flame and smoke limitations.

**1.08 MOCK-UP**

- A. Refer to 01 4000 for mock requirements.

**1.09 FIELD CONDITIONS**

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

**1.10 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.
- 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 MATERIALS**

- A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  1. Physical Properties:
    - a. Core Density (ASTM D 1622) 2.0 -2.4 lb per cubic foot
    - b. Aged Thermal Resistance (ASTM C 518) 7.4 sf h degree F / BTU
    - c. Air Leakage @ 75 Pa @ 1" (ASTM E 283) < 0.02 L / sm<sup>2</sup>
    - d. Air Permeance @ 75 PA @ 1" (ASTM E 2178) < 0.02 L / sm<sup>2</sup>
    - e. Compressive Strength (ASTM D 1621) 31 psi
    - f. Tensile Strength (ASTM D 1623) 44 psi
    - g. Dimensional Stability @ 158 degree F, 97% RH (168 hours) (ASTM D 2126) -3.7% (% volume change)
    - h. VOC Emissions - meets Greenguard Gold Criteria
    - i. Fungi Resistance (ASTM C 1338) No fungal growth.
    - j. Closed Cell Content (ASTM D 2856) 98%
    - k. Surface Burning Characteristics, 4" Thick (ASTM E 84) Flame Spread < 15, Smoke Development < 450.
  2. Product Approval:
    - a. International Code Council Evaluation Services Report #3210

- b. Approved for non-structural walls in building types I, II, III, IV, and V construction under IBC.
  - c. Approved for exterior walls in building types I, II, III, and IV construction.
  - d. Passed AC 377 Appendix X compliant NFPA 286.
3. Sustainability Requirements:
- a. Minimum Biobased Content per the USDA: 7%
  - b. Minimum Recycled Content: Total Recovered Materials: 5%

## **2.02 ACCESSORIES**

- A. Primer: As required by insulation manufacturer.

## **2.03 PROTECTIVE INTUMESCENT COATINGS:**

- A. Provide application (mils/thickness as required to achieve required ratings) over spray foam insulation for a minimum 25 minute fire barrier in all locations where spray foam insulation is not protected by approved fire barriers and is not in a plenum space (ie: gypsum board), as required by all applicable codes include but not limited to IBC 2009, IMC Current Issue. NFPA 286, UBC 263, ASTM 84-98, ASTM D3359, toxicity test B SS 7239. Application must meet all applicable codes and all requirements of all governing authorities, and all local authorities having jurisdiction.
1. Coordinate with insulation to be installed on site. Provide manufacturer's written verification that coating is compatible with insulation and meets requirements of all codes/regulations. Provide all primers and accessories as recommended by manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 PREPARATION**

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

### **3.03 APPLICATION**

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Apply insulation by spray method, to a uniform monolithic density without voids.
- C. Apply to achieve a thermal resistance R-value of R-25 at roof, fascia and soffit applications.
  - 1. For spray foam R value only
  - 2. Provide number of applications as required for R-value.

### **3.04 FIELD QUALITY CONTROL**

- A. Field inspections and tests will be performed by an independent testing agency under provisions of Section 014000 - Quality Requirements.

### **3.05 PROTECTION**

- A. Do not permit subsequent construction work to disturb applied insulation.

### **END OF SECTION**

## **SECTION 072500 - WEATHER BARRIERS**

### **PART 1 - GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Requirements of the Government's Solicitation and Division 01 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 05 4000 – Cold-Formed Metal Framing
  3. Section 06 1000 – Rough Carpentry
  4. Section 07 1300 – Sheet Waterproofing
  5. Section 07 6200 – Sheet Metal Flashing and Trim
  6. 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 07 6500), 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 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. (Referred to as Air Barrier on drawings).

### **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 screws for brick ties and 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, Contracting Officer, Contracting Officer Representative(s), installer, Architect, 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.

## **1.11 MOCK UP**

- A. Provide mock up per 01 4000 Quality Requirements.

## PART 2 - PRODUCTS

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

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier with the following minimum 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 that 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 Membrane Wall Flashing: 0.8 mm (32 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%.
- E. Joint Reinforcing Strip: Air barrier manufacturer's approved tape.
- F. Transition Tape: 0.8 mm (32 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.
  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. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 50 - 75mm (2-3 in.) wide, manufacturer's recommended self-adhesive tape. Gaps greater than 6mm (1/4 in.) should be filled with mastic or caulk, allowing sufficient time to fully cure before application of the tape and fluid applied air barrier system.
- C. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.
- D. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- E. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- F. Remove excess mortar from masonry ties, shelf angles, and other obstructions.



- G. 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.
- H. 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 JOINT TREATMENT**

- A. Gypsum Sheathing: Fill joints greater than 1/4 inch (6 mm) with sealant according to ASTM C1193 and with air barrier manufacturer's written instructions. Apply tape to joint prior to installing fluid air barrier membrane.

### **3.04 AIR BARRIER MEMBRANE INSTALLATION**

- A. Prior to screw attaching masonry anchors, as specified in Section 04 2000, to the substrate, the vapor permeable, fluid-applied membrane air barrier must be applied. The vapor permeable, fluid-applied membrane is then reapplied over the masonry anchor after the masonry anchor is screw attached to assure a waterproof condition if required by the membrane air barrier manufacturer, as a result of the warranty specified at the end of this section.
- B. Apply air barrier membrane to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
- C. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
- D. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
  - 1. Vapor-Permeable Membrane Air Barrier: 90-mil (2.4-mm) wet film thickness, 45-mil (1.2-mm) dry film thickness or as recommended by the manufacturer to achieve the minimum product performances specified according to type application.
- E. Do not cover air barrier until it has been tested and inspected by the Government's testing agency.
- F. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

### **3.05 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.

### **3.06 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.

### **3.07 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.

### **3.08 WARRANTY**

- A. The Air Barrier 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 AIR BARRIER WARRANTY**

**NAME OF PROJECT:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**AIR BARRIER CONTRACTOR:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

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

- B. The Air Barrier 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 air barrier manufacturers' recommendations.
- C. The Air Barrier Contractor and General Contractor do hereby guarantee the air barrier 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 Air Barrier 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 air barrier systems and the best standards applicable to the particular air barrier type in value and in accordance with construction documents as are necessary to maintain said work in air barrier 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 Air Barrier 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 Air Barrier Contractor or General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Air Barrier 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).

\_\_\_\_\_  
**Air Barrier Contractor's Authorized  
Signature**

\_\_\_\_\_  
**General Contractor's Authorized  
Signature**

\_\_\_\_\_  
**Typed Name and Title**

\_\_\_\_\_  
**Typed Name and Title**

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

**END OF SECTION**

## **SECTION 074113 - METAL ROOF PANELS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Mechanically-seamed, standing seam metal roof panels, with related metal trim and accessories.
- B. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. SS Credit 7.2 - Heat Island Effect - Roof
  - 3. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. D. Section 01 7419 - Construction Waste Management and Disposal
- D. Division 05 Section "Structural Steel Framing" for structural steel framing supporting metal panels.
- E. Division 05 Section "Steel Decking" for continuous metal decking supporting metal panels.
- F. Division 05 Section "Cold Formed Metal Trusses"
- G. Division 07 Section "Metal Soffit Panels"
- H. Division 07 Section "Sheet Metal Flashing and Trim" for formed sheet metal copings, flashings, reglets, and roof drainage items in addition to items specified in this Section.
- I. Division 07 Section "Roof Specialties" for manufactured copings, reglets, and roof drainage items in addition to items specified in this Section.
- J. Division 07 Section "Joint Sealants" for field-applied Joint Sealants

### **1.03 REFERENCES**

- A. American Architectural Manufacturer's Association (AAMA): [www.aamanet.org](http://www.aamanet.org)
  - 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)
  - 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 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. 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.
  - 3. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - 4. ASTM A 980 - Standard Specification for Steel, Sheet, Carbon, Ultra High Strength Cold Rolled.
  - 5. ASTM C 645 - Specification for Nonstructural Steel Framing Members.
  - 6. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
  - 7. ASTM D 1003 - Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics.
  - 8. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
  - 9. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
  - 10. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.



11. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
  12. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
  13. ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
- D. Cool Roof Rating Council (CRRC): [www.coolroofs.org/productratingprogram.html](http://www.coolroofs.org/productratingprogram.html)
1. CRRC-1-2008 - CRRC Product Rating Program.
- E. International Accreditation Service (IAS):
1. IAS AC 472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems, Part B.
- F. Underwriters Laboratories, Inc. (UL): [www.ul.com](http://www.ul.com)
1. UL 580 - Tests for Uplift Resistance of Roof Assemblies
- G. US Environmental Protection Agency: [www.energystar.gov/index.cfm](http://www.energystar.gov/index.cfm)
1. Energy Star Reflective Roof Products.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Contracting Officer, Contracting Officer Representative(s), Architect, 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 openings and penetrations and manufacturer's accessories with installation of metal panels.
  4. Coordinate roofing slopes as required by manufacturer.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer/Source: Provide metal roof panel assembly and accessories from a single manufacturer providing fixed-base roll forming, and accredited under IAS AC 472 Part B.

- B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum five years experience in manufacture of similar products in successful use in similar applications.
  - 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
    - a. Product data, including certified independent test data indicating compliance with requirements.
    - b. Samples of each component and each color
    - c. Sample submittal from similar project.
    - d. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
    - e. Sample warranty.
    - f. IAS AC 472 certificate.
- C. Installer Qualifications: Experienced Installer certified by metal panel manufacturer with minimum of five 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.

## **1.06 ACTION SUBMITTALS**

- A. Product Data: Manufacturer's data sheets for specified products.
- B. 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, roof accessories, lightning arresting equipment, 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 data indicating compliance with performance requirements.
  - 3. Include structural data indicating compliance with requirements of authorities having jurisdiction.

- C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
- D. Samples for Verification: Provide 12-inch- (305 mm-) long section of each metal panel profile. Provide color on sample panel verifying color selection.
- E. Informational Submittals:
  - 1. Product Test Reports: Indicating compliance of products with requirements, witnessed by a professional engineer.
  - 2. Qualification Information: For Installer firm and Installer's field supervisor.
  - 3. IAS Accreditation Certificate: Indicating that manufacturer is accredited under provisions of IAS AC 472.
  - 4. Manufacturer's Warranties: Sample copy of manufacturer's standard warranty.
- F. Sustainability Submittals, Product data for LEED Compliance:
  - 1. 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)
    - 2) Total weight of products provided
  - 2. Submit manufacturer's product data documenting minimum SRI rating of finish intended for use.
- G. Closeout Submittals
  - 1. Maintenance data.
  - 2. Manufacturer's Warranty: Executed copy of manufacturer's standard warranty.

#### **1.07 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 panel system 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 instructions. Provide wood collars for stacking and handling in the field.

## **1.08 COORDINATION**

- A. Coordinate sizes, profiles, and locations of roof curbs and other roof-mounted equipment and roof penetrations, based upon sizes of actual selected equipment.

## **1.09 WARRANTY**

- A. Provide warranty per the section 07 0100 Special Project 5 Year Warranty.
- B. Special Manufacturer's Warranty: Furnish manufacturer's no-dollar-limit materials and workmanship warranty for the roofing system. The warranty period shall not be less than 20 years from the date of Beneficial Occupancy of the work. The warranty shall provide that if within the warranty period the metal roofing system becomes non-watertight or shows evidence of corrosion, perforation, rupture or excess weathering due to deterioration of the roofing system resulting from defective materials or installed workmanship the repair or replacement of the defective materials and correction of the defective workmanship shall be the responsibility of the roofing system manufacturer. Repairs that become necessary because of defective materials and workmanship while under warranty shall be performed within 7 days after notification, unless additional time is approved by the Government in writing. Failure to perform repairs within the specified period of time will constitute grounds for having the repairs performed by others and the cost billed to the manufacturer.
- C. Special Weather tightness Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail to remain weathertight, including leaks, without monetary limitation for 20 years from date of Beneficial Occupancy.
- D. 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:
    - a. Color fading in excess of 5 Hunter units per ASTM D2244.
    - b. Chalking in excess of No. 8 rating per ASTM D4214.
    - c. Failure of adhesion, peeling, checking, or cracking.
    - d. Warranty Period: [25] years from date of Beneficial Occupancy.

## **1.10 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 PERFORMANCE REQUIREMENTS**

- A. General: Provide metal roof 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 Materials Content - 30%
- C. Radiative Property Performance:
  - 1. Solar Reflectance Index: Minimum 78 for roof slopes of 2:12 or less and 29 for roof slopes greater than 2:12 under medium wind conditions, per ASTM E 1980.
  - 2. Energy Star Qualified: Listed on USDoE ENERGY STAR Roof Products Qualified Product List.
  - 3. Energy Performance: Listed in CRRC Rated Product Directory, with minimum properties as required by applicable Energy efficiency or High-Performance Green Building standard.
- D. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:
  - 1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
    - a. Wind Uplift Testing: Certify capacity of metal panels by actual testing of proposed assembly per ASTM E 1592.
  - 2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of L/240 of the span with no evidence of failure.
  - 3. Seismic Performance: Comply with ASCE 7, Section 9, "Earthquake Loads."
- E. Wind Uplift Resistance: Comply with UL 580 for wind-uplift class UL-90.

- F. Air Infiltration, ASTM E 1680: Maximum 0.25 cfm/sq. ft. (1.27 L/s per sq. m) at static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).
- G. Water Penetration Static Pressure, ASTM E 1646: No uncontrolled water penetration at a static pressure of 12 lbf/sq. ft. (575 Pa).
- H. 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 METAL ROOF PANELS**

- A. Mechanically-seamed, Concealed Fastener, Metal Roof Panels: Structural metal roof panel consisting of formed metal sheet with vertical ribs at panel edges, installed by lapping and mechanically interlocking edges of adjacent panels, and attaching panels to supports using concealed clips and fasteners in a weathertight installation.
  - 1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A 755/A 755M.
    - a. Nominal Coated Thickness: 24 gage.
    - b. Panel Surface: Smooth with striations in pan
    - c. Exterior Finish: Fluoropolymer two-coat metallic color system
    - d. Color: Manufacturer's standard or custom color as required to match base standard "Colonial Red" color. Final acceptance of proposed color will be at the Government's sole discretion
  - 2. Panel Width: 16 inches (406 mm).
  - 3. Panel Seam Height: 2 inch (50.8 mm).
  - 4. Joint Type: Mechanically seamed.

## **2.03 METAL ROOF PANEL ACCESSORIES**

- A. General: Provide complete metal roof panel assembly incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings, in manufacturer's standard profiles and profiles as indicated. Provide required fasteners, closure strips, thermal spacers, splice plates, support plates, and sealants as indicated in manufacturer's written instructions.

- B. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.
- C. Panel Clips: Provide panel clip of type specified, at spacing indicated on approved shop drawings.
  - 1. Two-piece Floating: ASTM C 645, with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements. Provide bearing plates for panel clips.
- D. Panel Fasteners: Self-tapping screws and other acceptable corrosion-resistant fasteners recommended by roof panel manufacturer.
  - 1. Where exposed fasteners cannot be avoided, supply fasteners with EPDM or neoprene gaskets, with heads matching color of metal panels by means of factory-applied coating.
  - 2. *Coordinate fastener length and ensure fasteners do not penetrate through to interior face of exposed wood decking materials where applicable.*
- E. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:
  - 1. Factory-Applied Seam Sealant: Manufacturer's standard hot-melt type.
  - 2. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
- F. Steel Sheet Miscellaneous Framing Components: ASTM C 645, with ASTM A 653/A 653M, G60 (Z180) hot-dip galvanized zinc coating.
- G. Insulation:
  - 1. Thermal Insulation: Fiberglas felt faced Polyisocyanurate board insulation. ASTM C1289, Type II, compressive strength of 35 psi with maximum flame spread and smoke development indexes of 75 and 450 respectively. Provide thickness as required to achieve R-25 taking into account thermal drift after 2 years. Provide minimum thickness to meet R-Values and attachment per wind uplift and manufacturers requirements.
- H. Roofing Underlayment:
  - 1. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 Mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

- a. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
    - b. Low-temperature Flexibility: ASTM D 1970; passes after Testing at minus 20 deg F (29 deg C).
  2. It shall be the roofing contractor's responsibility to verify with the roofing underlayment manufacturer that the products being provided and installed are approved to be installed on the roof pitch indicated on the drawings.
- I. Information Card
1. For each roof, provide a typewritten card, laminated in plastic and framed for interior display or a photoengraved 0.032 inch thick aluminum card for exterior display. Card to be 8 1/2 by 11 inches minimum and contain the information listed on form 1 provide by the Government. Install card near point of access to roof, or where indicated.
- J. Prefabricated Roof Jacks
1. Pipe flashings shall be a one piece EPDM (ethylene propylene diene monomer) molded rubber boot having a serviceable temperature range of -65°F to 212°F and shall be resistant to ozone and ultraviolet rays. Units shall have an aluminum flanged base ring. Do not install pipe flashings through any panel seams - install ONLY in the flat portion of the panel.

## **2.04 FABRICATION**

- A. General: Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Fabricate metal panel joints configured to accept factory-applied sealant providing weathertight seal and preventing metal-to-metal contact and minimizing noise resulting from thermal movement.
- C. Form panels in continuous lengths for full length with no end laps.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching metal panel substrate and finish.

## **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 and warranty requirements.
- C. Interior Finish: 0.5 mil (0.013 mm) total dry film thickness consisting of primer coat and wash coat of manufacturer's standard light-colored acrylic or polyester backer finish.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.
  - 1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
  - 2. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:
    - a. 1/4 inch (6 mm) in 20 foot (6.1 m) in any direction.
    - b. 3/8 inch (9 mm) over any single roof plane.
- B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal roof panel system installation.

### **3.02 PREPARATION**

- A. Miscellaneous Supports: Install subframing, girts, furring, and other miscellaneous panel support members according to ASTM C 754 and manufacturer's written instructions.
- B. Flashings: Provide flashings as required to complete metal roof panel system. Install in accordance with Section 07 6200 "Sheet Metal Flashing and Trim" and approved shop drawings.

### **3.03 METAL PANEL INSTALLATION**

- A. Mechanically-Seamed, Standing Seam Metal Roof Panels: Install weathertight metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal roof panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions. Anchor panels and other components securely in place. Provide for thermal and structural movement.
- B. Attach panels to supports using clips, screws, fasteners, and sealants recommended by manufacturer and indicated on approved shop drawings.
  - 1. Fasten metal panels to supports with concealed clips at each location indicated on approved shop drawings, with spacing and fasteners recommended by manufacturer.
  - 2. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
  - 3. Provide weatherproof jacks for pipe and conduit penetrating metal panels of types recommended by manufacturer.
  - 4. 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 manufacturer.

### **3.04 ACCESSORY INSTALLATION**

- A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with 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, copings, 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. Provide concealed fasteners except where noted on approved shop drawings.
  - 4. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

- B. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.
  - 1. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants"
- C. Install self adhered roofing underlayment in accordance with the manufacturer's instructions.
- D. Install thermal insulation board in accordance with manufacturer's instructions, uplift requirements, and all warranty requirements of the roof and insulation systems manufacturers.

### **3.05 FIELD QUALITY CONTROL**

- A. Roofing Consulting Services:
  - 1. The Contractor 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.
- B. Manufacturer's Technical Representative
  - 1. The representative shall have authorization from manufacturer to approve field changes and be thoroughly familiar with the products and with installations in the geographical area where construction will take place. The manufacturer's representative shall be an employee of the manufacturer with at least 5 years experience in installing the roof system. The representative shall be available to preform field inspections and attend meetings as required herein, and as requested by the Government.
- C. Manufacturer's Field Inspections

1. Manufacturer's technical representative shall visit the site as necessary during the installation process to assure panels, flashings, and other components are being installed in a satisfactory manner. Manufacturer's technical representative shall perform a field inspection during the first 20 square of roof panel installation and at Beneficial Occupancy prior to issuance of warranty, as a minimum, and as otherwise requested by the Government. Additional inspections shall not exceed one for 100 squares of total roof area with the exception that follow-up inspections of previously noted deficiencies or application errors shall be performed as requested by the architect. Each inspection visit shall include a review of the entire installation to date. After each inspection, a report, signed by the manufacturer's technical representative, shall be submitted to the Government noting the overall quality of work, deficiencies and any other concerns, and recommended corrective actions in detail. Notify the Government a minimum of 3 workings days prior to site visit by manufacturer's technical representative.

### **3.06 CLEANING AND PROTECTION**

- A. Remove temporary protective films immediately in accordance with metal roof panel manufacturer's instructions. Clean finished surfaces as recommended by metal roof panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Government.

**END OF SECTION**

## **SECTION 074213 - RIBBED METAL WALL PANELS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Ribbed-profile, concealed fastener metal wall panels, with related metal trim, and accessories.
- B. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content.
  - 2. The contractor is expected to understand the LEED 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 6000 - Product Requirements
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal panels.
- E. Division 07 Section "Thermal Insulation" for thermal insulation installed behind metal panels.
- F. Division 07 Section "Air Barriers" for air barriers within wall assembly and adjacent to wall assembly.
- G. Division 07 Section "Metal Soffit Panels" for soffit panels installed with metal wall panels.
- H. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing items in addition to items specified in this Section.

#### **1.03 REFERENCES**

- A. American Architectural Manufacturer's Association (AAMA): [www.aamanet.org](http://www.aamanet.org)
  - 1. 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)

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 E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  7. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
  8. 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, Part B.

#### **1.04 QUALITY ASSURANCE**

- A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer accredited under IAS AC472, Part B.
- B. Manufacturer Qualifications: Manufacturer with a minimum five years experience in manufacture of similar products in successful use in similar applications.
- C. Installer Qualifications: Experienced Installer with minimum of five years experience with successfully completed projects of a similar nature and scope.
  1. Installer's Field Supervisor: Experienced mechanic supervising work on site whenever work is underway.

- D. Steel Construction Publications: Comply with published recommendations in the following, unless more stringent requirements are indicated.
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 Contracting Officer, Contracting Officer Representative(s), 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. 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.
- C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
- D. Samples for Verification: Provide 12-inch- (305 mm-) long section of each metal panel profile. Provide color chip verifying color selection.
- E. Informational Submittals

1. Product Test Reports: Indicating compliance of products with requirements.
  2. Qualification Information: For Installer firm and Installer's field supervisor.
  3. IAS Accreditation Certificate: Indicating that manufacturer is accredited under provisions of IAS AC472 Part B.
  4. Manufacturer's warranty: Unexecuted sample copy of manufacturer's warranty.
- F. Sustainability Submittals, Product data for LEED 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.
- G. Closeout Submittals
1. Maintenance data.
  2. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

#### **1.07 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.
  3. Shield foam insulated metal panels from direct sunlight until installation.

#### **1.08 WARRANTY**

- A. Provide warranty per the section 07 0100 Special Project Warranty by roofing and metal wall panel contractor and General Contractor.



- B. 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.
- C. Special Weather tightness Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail to remain weathertight, including leaks, without monetary limitation for 15 years from date of Beneficial Occupancy.
- D. 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:
    - a. Color fading in excess of 5 Hunter units per ASTM D2244.
    - b. Chalking in excess of No. 8 rating per ASTM D4214.
    - c. Failure of adhesion, peeling, checking, or cracking.
    - d. Warranty Period: [25] years from date of Beneficial Occupancy.

## **1.09 MOCK -UP**

- A. Include ribbed metal wall panels in project mock-up. Refer to drawing sheet A4.1 for wall mockup requirements.

## **1.10 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 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 Materials 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. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
    - a. Wind Negative Pressure: Certify capacity of metal panels by actual testing of proposed assembly.
  - 2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of L/120 of the span with no evidence of failure.
- D. Wall Panel Air Infiltration, ASTM E283:
  - 1. 0.002 cfm/sq. ft. air infiltration at static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).
  - 2. 0.003 cfm/sq. ft. air infiltration at static-air-pressure difference of 12.00 lbf/sq. ft. (575 Pa).
- E. Wall Panel Water Penetration Static Pressure, ASTM E331: No uncontrolled water penetration at a static pressure of 20.00 lbf/sq. ft. (958 Pa).
- F. 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 WALL PANELS**

- A. Ribbed-Profile, Concealed Fastener Metal Wall Panels: Structural metal panels consisting of formed metal sheet with fastener leg for concealed attachment to wall framing.
  - 1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, structural quality, Grade 50, Coating Class AZ50 pre-painted by the coil-coating process per ASTM A755/A755M.-
    - a. Nominal Thickness: 24 gauge coated thickness, with smooth surface.
      - 1) Exterior Finish: Fluoropolymer two-coat system
      - 2) Color: As selected by the Government from manufacturer's standard colors

2. Panel Width: 16 inches (406 mm).
3. Panel Thickness: 7/8 inch (22 mm).

## **2.03 MISCELLANEOUS MATERIALS & ACCESSORIES**

- A. General: Provide complete metal panel assemblies incorporating trim, copings, fascia, gutters and downspouts, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
- B. Sub-framing Z-girts: See specification section 07 4800 - Continutous Insulation Channels
- C. Flashing and Trim: Match material, thickness, and finish of metal panels.
- D. Panel 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.
- E. Panel Sealants:
  1. VOC Content of Interior Sealants: Sealants used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Architectural Sealants: 250 g/L.
  2. Concealed Joint Sealant: Non-curing butyl, AAMA 809.2.
  3. Elastomeric Joint Sealant: Urethane sealant, single-component, ASTM C920 Type S, Grade NS, Class 25, Use NT, A, M, G, O.
  4. Tape Mastic: Manufacturer's standard butyl type.

## **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.

## **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 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 flange. Snap-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 and joint sealers.
- D. Joint Sealers: Install liquid sealants where indicated and where required for weatherproof performance of metal panel assemblies.

1. Seal panel base assembly, openings, panel head joints, and perimeter joints using joint sealers indicated in manufacturer's instructions.
2. Seal perimeter joints between window and door openings and adjacent panels using elastomeric joint sealer.
3. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants."

### 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, copings, 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 FIELD QUALITY CONTROL

- A. Roofing/Wall Consulting Services:
1. The ***Government (Modified by Addendum No. 3)*** 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. 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.

### 3.05 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.

**END OF SECTION**

## **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. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Division 05 Section "Structural Steel Framing" for steel framing supporting metal panels.
- E. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal panels.
- F. Division 07 Section "Metal Roof Panels" for metal roof panels installed with metal soffit and liner panel
- G. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing items in addition to items specified in this Section.

#### **1.03 REFERENCES**

- A. American Architectural Manufacturer's Association (AAMA): [www.aamanet.org](http://www.aamanet.org)
  - 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 Contracting Officer, Contracting Officer Representative(s), 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. 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.
- C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
- D. Samples for Verification: Provide 12-inch- (305 mm-) long section of each metal panel profile. Provide color chip verifying color selection.
- E. Informational Submittals:
  1. Product Test Reports: Indicating compliance of products with requirements.
  2. Qualification Information: For Installer firm and Installer's field supervisor.

3. IAS Accreditation Certificate: Indicating that manufacturer is accredited under provisions of IAS AC472 Part B.
  4. Buy American Certification: Manufacturers' letters of compliance acceptable to authorities having jurisdiction, indicating that products comply with requirements.
  5. Manufacturer's warranty: Unexecuted sample copy of manufacturer's warranty.
- F. Sustainability Submittals, Product data for LEED 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
- G. Closeout Submittals:
1. Maintenance data.
  2. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

#### **1.07 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.

#### **1.08 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.

## **1.09 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 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 Materials 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 Governments'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.

## **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 and sheathing that will support soffit 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-roof meeting and perform no less than three (3) inspections during the installation of the new roof 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 roof system has been installed per the requirements of the contract documents, manufacturers requirements, and all warranty requirements.

### **END OF SECTION**

## **SECTION 074800 - CONTINUOUS INSULATION CHANNELS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Continuous insulation furring channels for the installation of ribbed metal wall panels and Aluminum-faced composite wall panels

#### **1.02 RELATED REQUIREMENTS**

A. Related Sections:

1. Section 01 3001 – Submittals
2. Section 06 1000 – Rough Carpentry
3. Section 07 2100 – Thermal Insulation
4. Section 07 2129 – Sprayed Insulation
5. Section 07 2500 – Weather Barriers
6. Section 07 4213 – Ribbed Metal Wall Panels
7. Section 07 6500 – Sheet metal flashing and Trim

#### **1.03 SYSTEM DESCRIPTION**

A. Design Requirements:

1. Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
2. Employ registered professional engineer, licensed to practice engineering in jurisdiction where Project is located, to engineer each component of rainscreen attachment system.
3. Structural Design: Exterior-insulated rainscreen wall assembly capable of withstanding effects of load and stresses from dead loads, wind loads, ice loads (if applicable) as indicated on Structural General Notes on Structural Drawings, and normal thermal movement without evidence of permanent defects of assemblies or components.

- a. Thermal Movements: Provide assemblies that allow for thermal movements resulting from the following maximum ambient temperatures by preventing overstressing of components and other detrimental effects:
  - 1) Temperature Change (range): 120 degrees Fahrenheit (67 degrees C), ambient:
- 4. Support Framing/Attachment System:
  - a. No framing component may penetrate the layer of continuous exterior insulation other than thermally isolated fasteners.
  - b. Frequency and spacing of stiffened horizontal girts as indicated by manufacturer in project specific engineering package.
- B. Performance Requirements:
  - 1. Rainscreen Attachment System Performance: Comply with ANSI/ASHRAE 90.1-2010 definition of continuous insulation (c.i.).
  - 2. No thermal bridges other than fasteners and service openings.
  - 3. Thermal Performance:
    - a. Full constructed assembly must have a minimum 95% EFFECTIVE R-value when compared to the exterior continuous insulations rated R-Value.
    - b. Continuous framing profiles (including C- or Z-shaped sections or furring) penetrating insulation not allowed.
    - c. Perform effective R-Value calculation or modeling in accordance with ASHRAE guidelines.
    - d. Wall Assembly effective R-Value: Refer to specification section 07 2100 – Thermal Insulation
  - 4. Structural Performance:
    - a. Wind Load Performance – Attachment system must show the following results when tested in accordance with ASTM E330-02.
      - 1) 90 pound per square foot negative and positive pressure held for 60 seconds, system components shall not experience failure or gross permanent distortion.



- 2) 135 pound per square foot negative and positive pressure held for 10 seconds, system components shall not experience failure or gross permanent distortion.
- b. Wind cycling (air pressure cycling) performance – Attachment system must show conformance to the following results when tested in accordance with ASTM E1886-05.
  - 1) A total of 4,500 air pressure cycles. Cycles must include 50 cycles at a maximum pressure of 90 pounds both positive and negative. Average cycle time must not be less than 3.25 seconds for both negative and positive cycles. Cladding weight supported during test must be a minimum of 11.5 pounds per square foot. No damage or deformation must be seen at end of test.
  - c. Gravity load (dead load) performance – Attachment system must demonstrate resistance to deflection under shear loading, applied parallel to the wall assembly and directly to the attachment system. Testing must be conducted using calibrated equipment by an IAS accredited third party laboratory. Deflection not to exceed 0.050 inches at 150 pounds per square foot.
5. Framing Members:
  - a. Test framing components to AAMA TIR- A8-[04] – Section 7.2 to determine structural performance and effective moment of inertia for each perforated component. Minimum Effective Moment of Inertia: 0.0066 in<sup>4</sup>.
  - b. Localized bending stress for eccentrically loaded framing members must be evaluated with the maximum effective length of resisting element not more than 12 inches.
6. Fasteners:
  - a. Minimum Safety Factor of 3 for both tension and shear values
  - b. Combined tension and shear shall be evaluated according to an interaction formula. Sum of terms shall not exceed 1.0.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 – Submittals, for submittal procedures
- B. Product Data: Submit manufacturer's product literature and descriptions of testing performed on system components to indicate meeting or exceeding specified performance.

**C. Shop Drawings:**

1. Submit connection details to the cladding manufacturer, showing interface of rainscreen attachment system to substrate and panels with adjacent construction, signed and sealed by Professional Engineer.
2. Show system installation and attachment, including fastener size and spacing.

**D. Structural Calculations:**

1. Submit rainscreen attachment manufacturer's comprehensive Structural Design analysis signed and sealed by a Professional Engineer.

**E. Samples: Submit following material samples for verification:**

1. Vertical Girts: Two (2) 12-inch long samples.

**F. Test Reports:**

1. Test to the following standards and provide written test reports by a third party:
  - a. AAMA TIR-A8-[04]: Structural Performance of Composite Thermal Barrier Framing Systems – Section 7.2
  - b. ASTM E330
  - c. ASTM E1233
  - d. Gravity load test report, performed by IAS accredited third party
2. Comprehensive three-dimensional thermal modeling report indicating framing systems impact on exterior insulation rated R-value.

## **1.05 QUALITY ASSURANCE**

**A. Manufacturer Qualifications:**

1. Minimum 5 years' experience specializing in the manufacturing of façade attachment/support framing similar to those specified.
2. Ability to demonstrate conformance to testing requirements.

**B. Installer Qualifications:**

1. Minimum of 3 years documented experience or minimum of 5 completed projects of equivalent scope and quality and recommended by manufacturer to perform work of this Section.

- C. Engineer Qualifications: Registered professional engineer experienced in the design of curtain wall systems, anchors, fasteners and licensed to practice engineering in the jurisdiction where Project is located.

#### **1.06 QUALITY CONTROL**

- A. Single source responsibility:
  - 1. Furnish engineered rainscreen attachment system components under direct responsibility of single manufacturer.
- B. Field Measurements: Verify actual supporting and adjoining construction before fabrication.
- C. Record field measurements on project record shop drawings.
- D. Established Dimensions: Where field measurements cannot be made without delaying work, guarantee dimensions and proceed with fabrication of rainscreen attachment system corresponding to established dimensions.

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

- A. Delivery: Deliver materials and components in manufacturers' original, unopened and undamaged containers or bundles, fully identified. Exercise care to avoid damage during unloading, storing and installation.
- B. Store, protect and handle materials and components in accordance with manufacturer recommendations to prevent damage, contamination and deterioration. Keep materials clean, dry, and free of dirt and other foreign matter, and protect from damage due to weather or construction activities.

#### **1.08 SEQUENCING**

- A. Ordering: Comply with manufacturers' ordering instructions and lead time requirements to avoid construction delays.
- B. Coordinate construction to ensure that assemblies fit properly to supporting and adjoining construction; coordinate schedule with construction in progress to avoid delaying work.

#### **1.09 WARRANTY**

- A. Manufacturer Warranties:
  - 1. Attachment System: Ten (10) year Limited Warranty.

- a. Covers components of the attachment system, including structural failure of components when all the materials and components are supplied and installed per manufacturer's requirements.
  - b. Includes labor and material for removal and replacement of defective material.
  - c. Includes labor to remove and reinstall façade finish panels, finish closures and façade finish accessories necessary to access defective material.
- B. Contractor's Warranties: 2-year labor warranty, starting from Beneficial Occupancy to cover repair of materials found to be defective as a result of installation errors.

## **PART 2 - PRODUCTS**

### **2.01 RIGID INSULATION**

- A. Refer to Section 07 2100 – Thermal Insulation.

### **2.02 RAINSCREEN ATTACHMENT/SUPPORT FRAMING SYSTEM**

- A. Comply with ANSI/ASHRAE 90.1-2010 definition of continuous insulation (c.i.).
- B. Coating Material: ASTM A1046, Zinc-Aluminum-Magnesium, minimum thickness ZM40.
- 1. ASTM A653 Galvanized steel is not acceptable.
- C. Steel Classification: Structural Steel (SS), Grade 50, 50 ksi Yield.
- D. Spacing: Comply with manufacturer's Professional Engineers calculations.
- E. Vertical Girt: Vertical girt with pre-punched attachment holes, directly attached on top of rigid insulation directly to substrate at regular spacing, with engineered thermally isolated washer assembly and fasteners.
- 1. Steel Thickness: Minimum 0.046-inch thick (18 gauge).
  - 2. Profile Depth:
    - a. 0.75 inches for installation of aluminum-faced composite metal wall panels
    - b. 1.50 inches for installation of ribbed metal wall panels
  - 3. Girt Fastening Face, Width: 2-inches.
- F. Fasteners:

1. Sufficient length to provide solid attachment through rigid insulation to structure as required by manufacturer.
2. Thermal Isolating Washers: Minimum 0.125 inch thick Polyoxymethylene copolymer (POM) washers with integral centering lip to act as a thermal break between wall anchor fasteners and girt.
  - a. Tensile Yield Strength: 9.57 ksi per ISO 527
  - b. Melting Temperature: 329 degrees Fahrenheit per ISO 3146
3. Steel stud framing substrate: Self-drill hex-washer-head stainless steel with 1,000 hour salt-spray rated thermoset polyester coating.
  - a. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
  - b. Minimum ultimate pull-out capacity from 18 gauge steel: 450 pounds.

**G. Accessories:**

1. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

## **2.03 SIDING/CLADDING PANEL**

- A. Refer to Division 07 Section 07 4213 – Ribbed Metal Wall Panels.

## **PART EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions for compliance with manufacturer requirements for installation conditions affecting performance of the work.
1. Do not proceed with installation until unsatisfactory conditions have been corrected.
  2. Ensure weather-resistant barrier (WRB) and rigid insulation is installed prior to installing rainscreen attachment system.
  3. Ensure fenestration, transitions, discontinuities, sills, and ledgers are flashed and sealed to move moisture to the exterior of the building.
- B. Field verify architectural details and mechanical and electrical requirements prior to commencing installation.

- C. Commencement of installation constitutes acceptance of existing conditions and acceptance of responsibility for satisfactory performance.

### **3.02 RAINSCREEN ATTACHMENT SYSTEM INSTALLATION**

A. Preparation:

1. Verify vertical girt does not cantilever past rigid insulation.

B. Installation

1. Install vertical girts in vertical orientation in strict accordance with manufacturer's installation instructions.
2. Do not use shims to plumb the wall between the vertical girt and insulation.
3. Minimum length of installed cut girt is 24-inches and shall be attached with at least two (2) fasteners.
4. Mount box girts, fastened up to 32 inches on center (as determined by the manufacturer's engineering calculations) over installed rigid insulation, using one wall anchor per pre-punched attachment hole at spacing indicated on engineering calculations.
  - a. Check plumb of vertical girts both parallel and perpendicular to the structure.
  - b. Tighten screws that attach vertical girt through insulation to substructure to a snug tight condition and not stripped. Do not over-torque beyond manufacturer's recommendation. If installed using hand tools, verify for each installer at beginning of project using snug-tight criteria. Do not use stripped holes.
  - c. Where obstructions are present and unavoidable (i.e. window openings), use laser or chalk line to restart girt.
  - d. Locate vertical girt at jamb conditions and outside corner conditions.
  - e. Use shearing instruments (i.e. snips, nibbler, etc.) for cutting metal framing components. Saws are not recommended, as the sparks produced during cutting will damage the anti-corrosion coating. If sparks are generated during cutting, be sure the portion of the component to be installed on the building is protected from sparks and that any stockpile near the cutting station is also protected.
  - f. The systems components should not be cut while installed on the building, unless using a shearing instrument.

- g. Replace thermal isolator pieces that break during installation.
- h. Provide a 3/8" – 1/2" gap between girts for expansion when multiple lengths of vertical girts are installed.

**3.03 SIDING/CLADDING PANEL INSTALLATION – REFER TO SECTIONS 07 4213**

- A. The cavity must be clear and free from air flow and drainage obstructions.

**END OF SECTION**

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

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counterflashings, other applications indicated on the drawings, and exterior penetrations and other items as required.
- B. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. section 01 7419 - Construction Waste Management and Disposal
- D. Section 061000 - Rough Carpentry: Wood nailers for sheet metal work.
- E. Section 07 4113 - Metal Roof Panels
- F. Section 07 4213 - Ribbed Metal Wall Panel
- G. Section 07 4293 - Metal Soffit Panels
- H. Section 077100 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.
- I. Section 077123 - Manufactured Gutters and Downspouts.
- J. Section 07 9000 - Joint Sealers.
- K. Section 08 4113 - Aluminum-framed Entrances
- L. Section 08 4313 - Aluminum-framed Storefronts
- M. Section 08 4413 - Glazed Aluminum Curtain Walls

### **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).

### **1.04 ADMINISTRATIVE REQUIREMENTS**

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

### **1.05 SUBMITTALS**

- A. See Section 01 3001 - Submittals for Submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples in size illustrating metal finish color.
- D. Submit details and mock-ups certified by manufacturer of outside and inside corner wall Flashing conditions.
- E. Sustainability Submittals, Product data for LEED 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 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

**1.11 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 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 Architect & Owner from manufacturer's full colors.
- B. Pre-Finished Aluminum:** ASTM B209 (ASTM B209M); 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 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).

- C. Provide Pre-Finished Galvanized Steel when in contact with steel products. Provide Prefinished Aluminum when in contact with Aluminum products.
- D. Bond Membrane: Do not allow dissimilar metals to contact. Provide a manufacturer approved bond membrane between dissimilar metals.
- E. Provide sheet metal in increased gage/thickness where required for cleats and as needed to meet applicable wind loading/ES-1 ratings.
- F. Recycled Content, for steel products: Minimum Total Recovered Materials Content - 30%

## **2.02 ACCESSORIES**

- A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
- B. Underlayment: Self Adhered Underlayment as specified in section 07 4113.
- 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: 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. Plastic Cement: 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 1 inches (25 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.

### **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, and 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.
- C. Roofing Consulting 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.

**END OF SECTION**

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## **SECTION 076500 - WALL FLASHING**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including requirements of the Government's Solicitation and Division 01 Specifications Sections, apply to this Section.
- B. Section 04 2000 – Unit Masonry
- C. Section 07 2500 Weather Barriers
- 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, 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.
- C. In no case shall wall flashing be exposed to sun light. If drawings show the flashing exposed disregard. Wall flashing is not to be exposed to sun light.

#### **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 contact 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 Propagations 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.

#### **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, Contracting Officer Representative(s), Contractor's 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 the warranty shall be established as the Beneficial Occupancy Date.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Through Wall Flashing as referred to on drawings: 40 mil total thickness, self-adhered flexible flashing installed in conjunction with stainless steel drip plate, terminate bar, and sealant. Provide mastic, adhesive, primers, seam tapes per manufacturers' instructions and specified warranties.
- B. 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%.
  - 8. ASTM C-836
  - 9. ASTM E-2357
  - 10. ASTM 330
- C. Sealant for Termination Bar:
  - 1. Provide manufacturer's recommended sealant to ensure compatibility with Air Barrier product being provided.
- D. Outside and inside corners - per manufacturer.
- E. Flashing Weeps – Mortar Nets, etc. Refer to Section 04 2000 "Unit Masonry" for additional installation requirements.

- F. Termination Bar, thru wall flashing at weeps, misc flashings.
  - 1. Stainless Steel Flashing and Special Sections: Provide 26 gauge stainless steel flashing termination strips with with sealant ledge as recommended by flashing manufacturer. Refer to flashing details on drawings.
- G. Stainless Steel Drip Plate:
  - 1. 26 gage, type 304 stainless steel.
  - 2. Factory formed, hemmed drip edge.
  - 3. Prefabricated inside, outside corners and end dams.
  - 4. Install in conjunction with flexible through wall flashing. Refer to flashing details on drawings.
  - 5. Install in strict accordance with manufacturer recommendations

## **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. Through Wall Flashing – Referred to on drawings as “Through Wall 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.
6. Refer to manufacturers details for inside and outside wall flashing corners



**PROJECT WALL FLASHING WARRANTY**

**NAME OF PROJECT:** \_\_\_\_\_

**PROJECT LOCATION:** \_\_\_\_\_

**GENERAL CONTRACTOR:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

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

- D. The Wall 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 Wall 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 Wall 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 Wall 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 Wall Flashing Contractor or the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Wall 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 Authorized  
Signature**

\_\_\_\_\_  
**General Contractor's Authorized  
Signature**

\_\_\_\_\_  
**Typed Name and Title**

\_\_\_\_\_  
**Typed Name and Title**

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

**END OF SECTION**



## **SECTION 077100 - ROOF SPECIALTIES**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

**A. Section Includes:**

1. Roof-edge specialties.
2. Roof-edge drainage systems.
3. Premanufactured roof curbs.

**B. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:**

1. MR Credit 4 - Recycled Content
2. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 7419 - Construction Waste Management and Disposal
- C. Section 05 5000 – Metal Fabrications
- D. Section 06 1000 – Rough Carpentry
- E. Section 07 4113 – Metal Roof Panels
- F. Section 07 6200 – Sheet Metal Flashing and Trim
- G. 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. 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.
- C. Samples: For each type of roof specialty and for each color and texture specified.
- D. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- E. 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.
- F. Sustainability Submittals, Product data for LEED 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 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.

### **1.11 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 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 0.034-inch (0.86-mm) thickness.
  - 2. Gutter Profile: As indicated on the drawings and in accordance with SMACNA's "Architectural Sheet Metal Manual."
  - 3. Minimum Gutter Size: 4-1/2 inches deep by 6 inches wide.
  - 4. Corners: Factory mitered and continuously welded.

5. Gutter Supports: Gutter brackets and Straps as recommended by manufacturer for application and required performance standards.
  6. Special Fabrications: Radiussed sections .
- 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. Size: 2" by 3"
- C. Zinc-Coated Steel Finish: Three-coat fluoropolymer
1. Color: As selected by the Government from manufacturer's full range and matching approved roofing / flashing material color.

### **2.03 PREMANUFACTURED ROOF CURBS**

- A. Curbs shall be constructed of steel thickness required to support applicable systems/equipment. Minimum 18 gauge zinc coated (galvanized) steel sheet.
- B. Fully mitered and heli-arc welded all corners. Provide integral base plates, with water diverter cricket.
- C. Minimum height of Curb shall be 8" above finished roof .
- D. Curbs shall be constructed to match slope of roof and provide a level top surface for mounting of equipment.
- E. Curb flange shall be constructed to match configuration of roof panel. Side flange shall extend to the next natural seam in the roof panels and conform to seam configurations.

### **2.04 MATERIALS**

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation.

### **2.05 UNDERLAYMENT MATERIALS**

- A. Refer to section 07 4113

## **2.06 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.

## **2.07 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. 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 and warranty requirements.

2. 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 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.

### **3.05 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**

## **SECTION 079005 - JOINT SEALERS**

### **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 LEED for New Construction points for the following Sections:
  - 1. IEQ Credit 4.1 Low-Emitting Materials-Adhesives and Sealants
  - 2. EQ Credit 4.2 - Low-Emitting Materials
  - 3. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions
- D. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers.
- E. Section 088000 - Glazing: Glazing sealants and accessories.
- F. Section 09 2116 - Gypsum Board Assemblies

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2022.
- 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. Sustainability Submittals, Product data for LEED 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.
- C. Product Data: Provide data indicating sealant chemical characteristics.
- D. Samples, Submit two samples, in size required to illustrate sealant colors for selection.
- E. 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 the lowest possible VOC content.
- B. As a minimum, provide products meeting LEED EQ Credit 4.1, 4.2, and requirements of specification section 01 6116.

## **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 Architect 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 Structural 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, up to 20.88 PSF
  11. Structural Performance of Curtain Walls by Uniform Air Pressure 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 Architect 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 pli, 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 Architect from manufacturer's full range.
11. Color: To be selected by the Architect 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 Architect 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 JOINT SEALANT WARRANTY**

**NAME OF PROJECT:** \_\_\_\_\_

**LOCATION:** \_\_\_\_\_

**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).**

\_\_\_\_\_  
Joint Sealant Contractor's Authorized  
Signature

\_\_\_\_\_  
General Contractor's Authorized  
Signature

\_\_\_\_\_  
Name and Title

\_\_\_\_\_  
Name and Title

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

**END OF SECTION**

## **SECTION 081113 - HOLLOW METAL DOORS AND FRAMES**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Fire-rated, and non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Thermally insulated hollow metal doors with frames.
- D. Steel glazing frames.
- E. Materials included in this section shall meet the requirements for L for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 7419 - Construction Waste Management and Disposal
- C. Section 04 2000 - Unit Masonry
- D. Section 087100 - Door Hardware.
- E. Section 088000 - Glazing: Glass for doors and borrowed lites.
- F. Section 09 2116 - Gypsum Board Assemblies
- G. Section 099113 - Exterior Painting: Field painting.
- H. Section 099123 - Interior Painting: Field painting.

#### **1.03 ABBREVIATIONS AND ACRONYMS**

- A. HMMA: Hollow Metal Manufacturers Association.
- B. NFPA: National Fire Protection Association.
- C. SDI: Steel Door Institute.

D. UL: Underwriters Laboratories.

#### **1.04 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. 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.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- J. ASTM F2247 - Standard Test Method for Metal Doors Used in Blast Resistant Applications (Equivalent Static Load Method); 2018.
- K. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- M. ITS (DIR) - Directory of Listed Products; current edition.
- N. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.



- O. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- P. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.
- Q. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- U. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.
- V. UL (DIR) - Online Certifications Directory; Current Edition.
- W. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- X. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Y. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

## **1.05 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 LEED Compliance:
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content.a

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

## **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

## **1.07 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.

## **1.08 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 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
  4. Door Edge Profile: 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.
- D. UFC 04-010-01

1. Provide door/frame assemblies tested to achieve moderate level damage category in accordance with ASTM F 2247 as noted in section B-3.2.1 of UFC 4-010-01 at all exterior door applications. Comply with ASTM F 2247 where applicable.

## **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. Type HM EXT, Exterior Doors: Thermally insulated.
  1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Insulated and designed to meet or exceed the requirements of UFC 4-010-01
    - 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., unless required otherwise for blast resistant doors
  2. Door 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.
  6. Door Finish: Factory primed and field finished.
- B. Type F HM , Interior Doors, 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. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
4. Door Finish: Factory primed and field finished.
5. Provide NIC rating of 25 or greater for all interior hollow metal door applications.

**C. Type F HM , Fire-Rated Doors:**

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. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
  - a. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
  - b. Provide units listed and labeled by UL (DIR) or ITS (DIR).
  - c. Attach fire rating label to each fire rated unit.
3. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
4. Door Thickness: 1-3/4 inch (44.5 mm), nominal.

D. Hardware Reinforcement: ANSI/SDI A250.6-1997.

## **2.04 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Exterior Door Frames: Full profile/continuously welded type.
  - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
  - 2. Frame Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum. unless required otherwise for blast resistance.
  - 3. Frame Finish: Factory primed and field finished.
  - 4. Weatherstripping in Hardware Specification Section: 08 7000.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
  - 1. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
  - 2. Frame Finish: Factory primed and field finished.
- D. Door Frames, Fire-Rated: Full profile/continuously welded type.
  - 1. Fire Rating: Same as door, labeled.
  - 2. Frame Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
  - 3. Frame Finish: Factory primed and field finished.
- E. Mullions for Pairs of Doors: Fixed, with profile similar to jambs.
- F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- G. Hardware Reinforcement: ANSI/SDI A250.6.
- H. 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. Glazing: As specified in Section 088000, factory installed.
- B. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

**C. 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.

**D. 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.

**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.

**E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.**

**F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.**

**G. 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.
- B. Factory Finish: Complying with ANSI/SDI A250.3, manufacturer's standard coating.

## **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.
    - a. 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.
6. 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**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 087100.
- F. Comply with glazing installation requirements of Section 088000.
- G. Touch up damaged factory finishes.
- H. 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. 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.
    - b. Install frames with removable glazing stops located on secure side of opening.
    - c. Install door silencers in frames before grouting.

- d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
  - e. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
  - f. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
  - g. 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. 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.
5. 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.
- I. 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.
- J. 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 frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 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**

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## **SECTION 081416 - FLUSH WOOD DOORS**

### **PART 1 GENERAL**

- A. Flush wood doors; flush and flush glazed configuration; fire-rated, non-rated, and acoustical.
- B. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. IEQ Credit 4.1 Low-Emitting Materials-Adhesives and Sealants
  - 3. EQ Credit 4.2 - Low-Emitting Materials
  - 4. IEQ Credit 4.4 Low-Emitting Materials-Composite Wood and Agrifiber Products
  - 5. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions
- D. Section 01 7419 - Construction Waste Management and Disposal
- E. Section 081113 - Hollow Metal Doors and Frames.
- F. Section 087100 - Door Hardware.
- G. Section 06 2000 - Finish Carpentry
- H. Section 088000 - Glazing.

### **1.03 REFERENCE STANDARDS**

- A. AWI (QCP) - Quality Certification Program; Current Edition.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- C. ICC (IBC) - International Building Code; 2012.

- D. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- F. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- G. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- H. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals for Submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Samples: Submit two samples of door veneer, in size illustrating wood grain, stain color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.
- F. Warranty, executed in the Government's name.
- G. Sustainability Submittals, Product data for LEED 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.



4. VOC Content Limitations: For the specified products, submit documentation of conformance with Specification Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

### **1.05 QUALITY ASSURANCE**

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

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

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

### **1.07 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

### **1.08 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with the lowest possible VOC content.
- B. As a minimum, provide products meeting LEED EQ Credit 4.1, 4.2, 4.3 and requirements of specification section 01 6116.
- C. Provide wood door products with a minimum total recycled content of 40%

## **PART 2 PRODUCTS**

### **2.01 DOORS AND PANELS**

- A. Doors: Refer to drawings for locations and additional requirements.

1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
  2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
1. Provide solid core doors at each location.
  2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
  3. Provide all doors with a minimum Noise Isolation Class (NIC) rating of 25 or greater in accordance with ASTM E413.
  4. Wood veneer facing with factory transparent finish . Color shall match Government sample.

## **2.02 DOOR AND PANEL CORES**

- A. Non-Rated Solid Core: Type particleboard core (PC), plies and faces as indicated above.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.
- C. Sound-Rated Doors: Equivalent to type, with particleboard core (PC) construction as required to achieve NIC rating specified; plies and faces as indicated above.

## **2.03 DOOR FACINGS**

- A. Veneer Facing for Transparent Finish: Select White oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
  1. Vertical Edges: Same species as face veneer.
  2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet (3 m) of each other when doors are closed.
- B. Facing Adhesive: Type I - waterproof.

## **2.04 DOOR CONSTRUCTION**

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
  - 1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
  - 2. Provide solid blocking for other throughbolted hardware.
- C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- E. Provide edge clearances in accordance with the quality standard specified.

## **2.05 FACTORY FINISHING - WOOD VENEER DOORS**

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. System - 12 Polyurethane Water-based.
    - b. Sheen: Satin.
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing.
- D. Color as selected by the Government for the manufacturer's full range of colors.

## **2.06 ACCESSORIES**

- A. Hollow Metal Door Frames: As specified in Section 081113.
- B. Glazing: As specified in Section 088000.
- C. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.
- D. Door Hardware: As specified in Section 087100.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

### **3.03 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

### **3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

### **END OF SECTION**

## **SECTION 083100 - ACCESS DOORS AND PANELS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Access door and frame units, fire-rated and non-fire-rated, in wall and ceiling locations.
- B. Section Includes: Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. EQ Credit 4.2 - Low Emitting Materials
  - 3. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 099113 - Exterior Painting: Field paint finish.
- D. Section 099123 - Interior 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 LEED 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
2. EQ Credit 4: Low-Emitting Materials:
  - a. If shop priming and/or painting is provided under this specification section, submit manufacturer's product data indicating intended product's compliance with the requirement of LEED EQ Credit 4.2 for paints and coatings. Submit documentation from the paint manufacturer indicating that shop primed coatings are compatible with field applied topcoats specified in Section 09 99123 as applicable.

## **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.

## **PART 2 PRODUCTS**

### **2.01 ACCESS DOORS AND PANELS ASSEMBLIES**

### **2.02 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 9113 or 09 9123
- 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.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify the Contracting Officer of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

### **3.03 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.

- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

**END OF SECTION**



## **SECTION 083459 -- WEAPONS VAULT DOOR**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Non-fire-rated vault doors, frames, hardware and accessories.
- B. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. The contractor is expected to understand the LEED 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 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Section 04 2000 - Unit Masonry
- E. Section 09 9123 - Interior Painting: Field painting.

#### **1.03 REFERENCE STANDARDS**

- A. U.S. General Services Administration – FS AA-D-600, Amendment 4, Door, Vault, Security.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- C. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- D. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames 2007 (R2011).
- E. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.
- F. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.

- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable 2015.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2014.
- I. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2014.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities 2009.

#### **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, frame profiles, any indicated finish requirements, head jamb and sill sections, and elevation of day gate.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Catalog Data: Catalog cuts and brochures showing that the proposed vault door unit conforms with the requirements in FS AA-D-600 and has been tested and approved by the General Services Administration (GSA)
- F. Sustainability Submittals, Product data for LEED 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. In accordance with FS AA-D-600.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

- C. 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. In accordance with FS AA-D-600.
- B. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- C. 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 Vault and Frames:
  - 1. The vault door unit shall be a steel security-vault type door with frame, day gate, and ramp type threshold (if required).
  - 2. Design and construct the door and frame assembly in accordance with FS AA-D-600 and with the following characteristics:
    - a. Class: 5-A
    - b. Type: III L – single leaf
    - c. Style: K – key change combination lock
    - d. Design: S – Single Lock
    - e. Door assembly must be GSA Approved door.
  - 3. Day Gate:
    - a. Provide a day gate designed for use with the vault door furnished, and that provides access control and weapons issues.
    - b. The gate shall:
      - 1) Be hinged on the same side as the vault door and swing into the vault, and shall be configured as a dutch door.
      - 2) Have a locking device operable from outside by key and from inside by knob or handle.

- 3) Gate shall include an issue port hatch and 12 gage thick steel shelf, 12 inches deep by width to match the port hatch.
  - 4) The issue port shall be a framed 8" x 12" opening with a minimum 22 gage thick steel protective door (hatch cover) which is hinged and lockable from the interior side.
  - 5) Weld the issue port frame to the day gate.
  - 6) Provide the manufacturer's standard finish
  - 7) The day gate shall not interfere with the operation of the vault door inner escape device.
4. Accessibility: Comply with ICC A117.1 and ADA Standards.
  5. Door Edge Profile: Manufacturers standard for application indicated.
  6. 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.
  7. 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.

## **2.02 MATERIALS**

- A. Manufacturer according to FS AA-D-600, Door, Vault, Security.
- B. Recycled Content: For Steel Products: Minimum Total Recovered Materials Content - 30%

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. In accordance with FS AA-D-600.
- B. Verify existing conditions before starting work.
- C. Verify that opening sizes and tolerances are acceptable.
- D. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 INSTALLATION**

- A. In accordance with FS AA-D-600.
- B. Install the vault door assembly in strict compliance with the printed instructions and drawings provided by the manufacturer. Install the day gate in a manner that does not interfere with operation of the release handle on the inside of the vault door. After installation, adjust the door, the locking mechanism, and the inner escape device for proper operation. Submit printed instructions and drawings provided by the manufacturer.
- C. 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. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - b. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - c. Remove temporary “shipping spreader bars” before installation.

### **3.03 TOLERANCES**

- A. In accordance with FS AA-D-600.

### **3.04 ADJUSTING**

- A. In accordance with FS AA-D-600.
- B. Adjust for smooth and balanced door movement.
- C. 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.
- D. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- E. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

**3.05 SCHEDULE**

A. Refer to Door and Frame Schedule on the drawings.

**END OF SECTION**

## **SECTION 083600 - SECTIONAL OVERHEAD DOORS**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. This section includes insulated, high-impact sectional overhead doors and accessories for complete installation, as follows:

#### **1.02 RELATED SECTIONS**

- A. Section 04 2000 - Unit Masonry
- B. Section 05 5000 - Metal Fabrications
- C. Section 08 7100 - Finish Hardware

#### **1.03 SUBMITTALS**

- A. Product Data: Completely describing components and performance.
- B. Shop Drawings: Showing details of fabrication, installation and accommodation to connecting work.
- C. Installation Instructions: For door, optional operator and accessories.
- D. Operating and Maintenance Data: For door, optional operator and accessories.

#### **1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Provide each sectional overhead door as a complete unit produced by a single manufacturer, including frames, sections, brackets, guides, tracks, counterbalance mechanisms, hardware, and operator [optional].
- B. Inserts and Anchorages: Furnished inserts and anchoring devices must be set, anchored or built into concrete or masonry; or drilled and tapped or welded to structural steel.
- C. Installer Qualification: Door manufacturer or trained, approved and licensed door installer.

### **PART 2 PRODUCT**

#### **2.01 MATERIALS:**

- A. Door Panels:

1. Door panels to be 2" thick unitized construction with exterior and interior panel skins firmly bonded to three pounds per square foot expanded polystyrene core insulation. Interior panel skin to be constructed of .090" high-impact polymer sheet for damage resistance. Exterior panel to be constructed of .030" aluminum with an enamel finish. Panels to be capped with co-extruded high-impact PVC edge capping containing UV inhibitors. Panel color to be as selected from manufacturer's full range of colors.

**B. Tracks, Supports, and Accessories:**

1. Tracks: Provide manufacturer's standard lower track to be constructed of formed 12-gauge galvanized steel. Track design to be angled toward building exterior and wrap around hardware on the interior. This design to offer knockout capability towards exterior while still providing security. Door hardware to ride in channel. Tracks to be securely mounted flush with door jamb to maintain full opening width. Track systems that reduce door-opening width will not be accepted.
2. Weatherseal: Provide TPR (Thermo Plastic Rubber) bulb compression seal and 1.5" strip brush seal along both vertical edges of door panel. Provide one EPDM (Ethylene Propylene Diene Monomer) bottom bulb compression seal extending the full horizontal width of the door. Provide 2" horizontal brush seal to seal against uppermost door section when door is in closed position. Door-mounted weatherseal rises with the door, so there is no exposed seal in the doorway. Neither Non-compression weatherseals nor weatherseals attached to the door track or frame will be accepted.
3. Accessories:
  - a. Manufacturer's standard slide lock with padlock provision provides both internal and external security with the addition of padlock by others.

**C. Hardware:**

1. General: Provide heavy-duty, rust-resistant fasteners with galvanized or zinc-plated steel to suit type of door.
  - a. Hinges: Heavy-duty flat panel hinge plates constructed from 13 gauge, zinc-plated steel fastened by four bolts per hinge plate. Hinges to be connected with removable pin and clip for quick installation and removal of door panels.



- b. Plungers: Manufacturers standard spring-loaded, round nosed, quick release plungers on knockout panels and fixed plungers on non-knockout panels. Plungers act as a quick release system when the door is impacted, preventing door panel damage. Plunger shafts to be 1/2" diameter and positioned in a steel housing. Housings to be zinc-plated. Products using roller wheels will not be accepted.

**D. Counterbalance:**

- 1. Torsion Spring: Operation by torsion-spring counterbalance consisting of adjustable-tension, tempered-steel torsion springs mounted on a cross header tubular steel shaft. Connect to door sections with galvanized 5/32" minimum diameter lift cables. Provide springs calibrated for 15,000-cycle minimum.
- 2. Provide cast-aluminum cable drums, grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft. Provide minimum of one additional midpoint bracket(s) to support shafts.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes your acceptance of conditions as satisfactory.
  - 1. Verify opening size, dimensions and tolerances.

**3.02 PREPARATION:**

- A. Protect surrounding areas and surfaces to prevent damage during work of this section.
- B. Jobsite to comply with all OSHA regulations.

**3.03 INSTALLATION:**

- A. General: Install door, track and operating equipment complete with necessary hardware, anchors, inserts, hangers and equipment supports according to shop drawings, manufacturer's instructions and as specified.
- B. Fasten track assembly to framing as specified in manufacturer's installation manual. Provide sway bracing, diagonal bracing, and reinforcing as required for rigid installation of track and door opening equipment.

- C. After completing installation, including work by other trades, test and adjust doors to operate easily, free from warp, twist or distortion, fitting weather-tight and knockout as detailed in manufacturer's standard performance specifications.

**END OF SECTION**

## **SECTION 084113 - ALUMINUM-FRAMED ENTRANCES**

### **PART 1 – GENERAL**

#### **1.01 SUMMARY**

- A. Section Includes: Swinging Blast Resistant Aluminum-Framed Entrances in Aluminum Curtain Wall Assemblies.
- B. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. The contractor is expected to understand the LEED requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.
- C. Related Sections:
  - 1. Section 01 3514.01 - LEED Credit Summary
  - 2. Section 01 6000 - Product Requirements
  - 3. Section 01 7419 - Construction Waste Management and Disposal
  - 4. Division 08 4413 - Glazed Aluminum Curtain Walls
  - 5. Division 08 7100 - Door Hardware
  - 6. Division 08 8000 - Glazing.

#### **1.02 REFERENCES**

- A. ASTM International.
  - 1. ASTM F 1642: Standard Method for Glazing and Glazing Systems Subjected to Airblast Loadings.
- B. Unified Facilities Criteria (UFC).
  - 1. UFC 1-200-01: General Building Requirements.
  - 2. UFC 3-310-01: Design: Structural Load Data.
  - 3. UFC 4-010-01: DoD Minimum Antiterrorism Standards for Buildings.

### **1.03 SYSTEM DESCRIPTION**

- A. General: Aluminum Entrance Systems, including glass and glazing, shims and anchors, accessories and perimeter sealing of entrance framing.
- B. Swing Door Performance Requirements:
  - 1. Wind loads: Provide immediate door framing for swing doors, including anchorage, capable of withstanding wind-load design pressures as determined per UFC 3-310-01 Design - Structural Load Data.
  - 2. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 psf (300 Pa) for single doors and 1.567 psf (76 Pa) for pairs of doors. A single 3'0" x 7'0" (915 x 2134) entrance door and frame shall not exceed .50 cfm per square foot. A pair of 6'0" x 7'0" (1830 x 2134) entrance doors and frame shall not exceed 1.0 cfm per square foot. Air leakage for fenestration and doors shall be determined in accordance with NFRC 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.
  - 3. Structural: Corner strength shall be tested per the Kawneer dual moment load test procedure and certified by an independent testing laboratory to ensure weld compliance and corner integrity [Testing procedure and certified test results available upon request].
  - 4. Overall U-Factor: 0.70 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.
  - 5. Overall SHGC: 0.25
  - 6. Overall Visible Transmittance: 40
  - 7. Labeling of Doors and Fenestration: The U-factor, SHGC, and air leakage rate for all manufactured doors and fenestration shall be determined by a laboratory accredited by a nationally recognized accreditation organization, such as the National Fenestration Rating Council. All products shall have a permanent name-plate, installed by the manufacturer, listing the U-factor, SHGC, Visible Transmittance and air leakage rate.
  - 8. UFC 4-010-01 Compliance:

- a. Provide system meeting UFC 4-010-01, Appendix B Best Practices, ASTM F2248 Design Approach for Laminated Glazing Systems.
  - 1) Level of Protection: Low/Medium
    - (a) Provide medium level of protection at assemblies containing door opening numbers 101a, 101b, and 143b.
    - (b) Provide low level of protection at all other assemblies not scheduled to receive medium level of protection above.
  - 2) Applicable Blast Weight: 55 lbs

#### **1.04 SUBMITTALS**

- A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware,
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details.
- C. Samples: Submit two samples [ 4 x 2] inches (102 x 51 mm) in size illustrating finished aluminum surface, glass, [ $\diamond$ ] glazing materials.
- D. Design Data: Refer to section 08 4413 - provide design and engineering data as required to confirm compliance with standards for overall curtain wall assembly that the door(s) is a part of.
- E. Sustainability Submittals, Product data for LEED Compliance:
  1. MR Credit 4 - Recycled Content
    - 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)
      - 2) Include total weight of products provided
  2. MR Credit 5: Regional Materials: Indicate distance from project site to:
    - a. Harvest/material extraction location
    - b. Manufacturing location.

- c. Indicate percentage of the material harvested and manufactured within 500 miles of the project site.

### **1.05 WARRANTY**

- A. Manufacturer's Product Warranty: Submit, for the Government's acceptance, manufacturer's warranty for entrance system as follows:
  1. Warranty Period: Five (5) years from Date of Beneficial Occupancy of the project. In addition, welded door corner construction shall be supported with a limited lifetime warranty for the life of the door under normal use.

### **1.06 QUALITY ASSURANCE**

- A. Qualifications:
  1. Installer Qualifications: Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
  2. Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.
  3. On access control installations, all wiring to be coordinated with a licensed electrical installer.
- B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

### **1.07 DELIVERY, STORAGE & HANDLING**

- A. Ordering: Comply with manufacturer's ordering instructions and lead- time requirements to avoid construction delays.
- B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle entrance doors and components to avoid damage. Protect entrance doors against damage from elements, construction activities, and other hazards before, during and after entrance installation.

## **1.08 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.
- B. Contractor shall give preference to products extracted and / or manufactured within 500 miles of the project meeting the requirements of LEED MR Credit 5.

## **PART 2 – PRODUCTS**

### **2.01 BASIS OF DESIGN**

- A. Single Source Requirements:
  - 1. Provide aluminum framed entrance doors from manufacturer of aluminum curtain wall assembly of which the door is a part of.

### **2.02 MATERIALS**

- A. Aluminum (Entrance Door and Components): Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
  - 1. Extruded Material Standard: ASTM B 221, 6063-T6 alloy and temper.
- B. Steel Reinforcement: Complying with ASTM A 36/ A 36M for structural shapes, plates and bars; ASTM A 611 for cold-rolled sheet and strip or ASTM A 570/ A 570M for hot-rolled sheet and strip.
- C. Glazing Gaskets / Setting Blocks: Manufacturer's standard glazing system of black, resilient glazing gaskets, setting blocks, and shims or spacers, fabricated from an elastomer of type and in hardness recommended by system and gasket manufacturer to comply with system performance requirements. Provide Fiberglass Pressure Plates as required to achieve overall thermal performance specified.
- D. Fasteners: Where exposed, shall be 300 Series, Stainless Steel.
- E. Weather Stripping: Manufacturer's standard replaceable weather stripping as follows:
  - 1. Meeting stiles on pairs of doors shall be equipped with an adjustable astragal utilizing wool pile with polymeric fin.
  - 2. The door weathering on a single acting offset pivot or butt hung door and frame (single or pairs) shall be comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.

- 3. Bottom Rail Sweep Strips shall be EPDM blade type gaskets in an aluminum extrusion.
- F. Recycled Content: For aluminum products: Minimum Total Recovered Materials Content - 30%

### **2.03 HARDWARE**

- A. General: Provide heavy-duty hardware units indicated in sizes, number, and type recommended by manufacturer for entrances indicated. Finish exposed parts to match door finish, unless otherwise indicated.
- B. Thresholds: At exterior doors, provide manufacturer's standard threshold with cutouts coordinated for operating hardware, with anchors and jamb clips, and not more than 1/2-inch- (12.7mm) high, with beveled edges providing a floor level change with a slope of not more than 1:2, and in the following material. Provide threshold width as required per project conditions.
- C. For each door, include weatherstripping and sill sweep strip.
- D. **Provide all other hardware for fully operational door**, refer to section 08 7100 for list of hardware being provided by others.

### **2.04 ACCESSORIES**

- A. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, non-migrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.
- B. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- C. Sealants and joint fillers for joints at perimeter of entrance system as specified in Section 07 9005 - Joint Sealers.
- D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

### **2.05 RELATED MATERIALS**

- A. Sealants: Refer to 07 9005 - Joint Sealers.
- B. Glass: Refer to 08 8000 - Glazing.



- C. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

## **2.06 COMPONENTS**

- A. Doors: Provide manufacturer's 2" (51 mm) thick glazed doors with nominal 0.188" (5 mm) thick, extruded tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded.
  - 1. Glazing Stops and Gaskets: Provide manufacturer's standard snap-on and screw applied extruded-aluminum glazing stops and preformed gaskets for glazed infill thickness specified.
  - 2. Stile Design:
    - a. Medium Stil: 3.5" Vertical Stile, 3.5" Top Rail, 10" Bottom Rail.
    - b. Coordinate with specified hardware. Notify Government if wider vertical stiles are required to accomodate specified hardware.
- B. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide non-staining, nonferrous shims for aligning system components.
- C. Provide manufacturer's standard adjustable glass jacks for door alignment.

## **2.07 FABRICATION**

- A. General: Fabricate components per manufacturer's installation instructions. When assembled, components will have accurately fitted joints to produce hairline joints.
  - 1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" (29) long fillet welds inside and outside of all four corners.
  - 2. Prepare components with internal reinforcement to receive door hardware.
  - 3. Factory assemble door and frame units and factory install hardware to greatest extent possible.
  - 4. Fabrication Tolerances: Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

## **2.08 FINISHES**

- A. Factory Finishing:

1. Refer to section 08 4413- Glazed Aluminum Curtain Walls. Door finish to match custom curtain wall factory finish.

## **2.09 SOURCE QUALITY CONTROL**

- A. Source Quality: Provide aluminum entrances specified herein from a single source.
  1. Building Enclosure System: When aluminum entrances are part of a building enclosure system, including storefront framing, windows, curtain wall system and related products, provide building enclosure system products from a single source manufacturer.
- B. Fabrication Tolerances: Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION**

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive storefront system and sill plate is level in accordance with manufacturer's acceptable tolerances.
  1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

### **3.02 INSTALLATION**

- A. General: Install entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
  1. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
  2. Provide alignment attachments and shims to permanently fasten system to building structure.
  3. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
  4. Set thresholds in bed of mastic and secure.

5. Adjusting: Adjust operating hardware for smooth operation.

**B. Related Products Installation Requirements:**

1. Sealants (Perimeter): Refer to 07 9005 - Joint Sealers.

2. Glass: Refer 08 8000 – Glazing.

a. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

**3.03 CLEANING & PROTECTION**

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Government's acceptance. Remove construction debris from project site and legally dispose of debris.

B. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum entrances from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants. Remove and replace damaged aluminum entrances at no extra cost.

**END OF SECTION**

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## **SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Architectural Aluminum Curtain Wall Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter seating of curtain wall framing.
- B. System depth: as required to meet UFC 4-010-01, Appendix B, ASTM F2248 Design Approach for Laminated Glass Glazing System.
- C. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. The contractor is expected to understand the LEED requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.
- D. Contractor's Option:
  - 1. Contractor shall provided specified aluminum framed curtain walls and entrance doors specified in this section and section 08 4113 for all curtain wall assemblies containing swinging entrances.
  - 2. At all other curtain wall applications, Contractor may provide curtain wall assemblies as specified in this section or blast resistant aluminum window systems specified in section 08 5200. Aluminum window systems to be finished to match curtain wall entrance systems.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Section 033000 - Cast-in-Place Concrete: Weld plates embedded in concrete for attachment of anchors.
- E. Section 051200 - Structural Steel Framing: Steel attachment members.

- F. Section 055000 - Metal Fabrications: Steel attachment devices.
- G. Section 072500 - Weather Barriers: Sealing framing to weather barrier installed on adjacent construction.
- H. Section 07 9005 - Joint Sealers: Perimeter sealant and back-up materials.
- I. Section 08 4113 - Aluminum-Framed Entrances
- J. Section 08 5200 - Blast Resistant Aluminum Window Systems
- K. Section 088000 - Glazing.
- L. Section 09 2116 - Gypsum Board Assemblies

### **1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure; 2017.
- C. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- E. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

- K. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- L. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- M. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- N. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference; 2000 (Reapproved 2016).
- O. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.
- P. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
- Q. Unified Facilities Criteria (UFC):
  - 1. UFC 1-200-01: General Building Requirements.
  - 2. UFC 3-310-01: Design: Structural Load Data.
  - 3. UFC 4-010-01: DoD Minimum Antiterrorism Standards for Buildings.
- R. Protective Design Center Technical Report (PDC-TR) 19 April 2012.

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples in size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.

- E. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- G. Structural Glazing Adhesive: Submit product data and calculations showing compliance with performance requirements.
- H. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- I. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in the Owner's name and registered with manufacturer.
- K. Sustainability Submittals, Product data for LEED Compliance:
  - 1. MR Credit 4 - Recycled Content
    - 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)
      - 2) Include total weight of products provided
  - 2. MR Credit 5: Regional Materials: Indicate distance from project site to:
    - a. Harvest/material extraction location
    - b. Manufacturing location.
    - c. Indicate percentage of the material harvested and manufactured within 500 miles of the project site.

## **1.05 QUALITY ASSURANCE**

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.



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

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

- A. See Section 014000 - Quality Requirements, for general requirements for mock-ups.
- B. Provide mock-up of one curtain wall unit including all Components, sealants, flashings, glazing, attachments, and anchorage.
- C. Locate on-site where directed by the Government; mock-up may remain as part of the Work.

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

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

#### **1.08 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C).
- C). Maintain this minimum temperature during and 48 hours after installation.

#### **1.09 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 10 year period after Date of Beneficial Occupancy.
- C. Provide 10 year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide 20 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

#### **1.10 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.
- B. Contractor shall give preference to products extracted and / or manufactured within 500 miles of the project meeting the requirements of LEED MR Credit 5.

## **PART 2 PRODUCTS**

### **2.01 CURTAIN WALL**

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
  - 1. Outside glazed, with pressure plate (fiberglass if necessary to achieve overall thermal performance specified) and mullion cover.
  - 2. Vertical Mullion Face Width: 2-1/2 inches (63.5 mm).
  - 3. Vertical Mullion Depth From Face to Back: As required to meet blast resistance requirements. Drawings indicate 7-1/2" depth. Advise the Government for coordination if required mullion depth exceed 7-1/2 inches.
  - 4. Finish: High performance organic coating -
    - a. Factory finish surfaces that will be exposed in completed assemblies.
    - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
    - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
    - d. See part 2.05 for additional requirements.
  - 5. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
  - 6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
  - 7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
  - 8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
  - 1. Design Wind Loads: Comply with the requirements of IBC 2015 code.

- a. Measure performance by testing in accordance with ASTM E330/E330M, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
  - b. Member Deflection: For spans less than 13 feet 6 inches (4115 mm), limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch (19 mm), whichever is less and with full recovery of glazing materials.
  - c. Member Deflection: For spans over 13 feet 6 inches (4115 mm) and less than 40 feet (12.2 m), limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch (1/240 of span plus 6.4 mm), with full recovery of glazing materials.
2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
  - a. Expansion and contraction caused by 180 degrees F (82 degrees C) surface temperature.
  - b. Expansion and contraction caused by cycling temperature range of 170 degrees F (77 degrees C) over a 12 hour period.
  - c. Movement of curtain wall relative to perimeter framing.
  - d. Deflection of structural support framing, under permanent and dynamic loads.
- C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
  1. Test Pressure Differential: 10 psf (480 Pa).
  2. Test Method: ASTM E331.
- D. Air Leakage: Maximum of 0.06 cu ft/min/sq ft (0.3 L/s/sq m) of wall area, when tested in accordance with ASTM E283 at 6.27 psf (300 Pa) pressure differential across assembly.
  1. Air leakage for fenestration and doors shall be determined in accordance with NFRCX 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.

**E. Thermal Performance Requirements:**

1. Overall U-value Including Glazing: [.50] Btu/(hr sq ft deg F) maximum.
2. U-value 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.
3. Overall Solar Heat Gain Coefficient Including Glazing: .25

**F. Optical Performance Requirements:**

1. Overall Visible Transmittance: .40

**G. Labeling of Fenestration:** The U-factor, SHGC, and air leakage rate for all manufactured doors and fenestration shall be determined by a laboratory accredited by a nationally recognized accreditation organization, such as the National Fenestration Rating Council. All products shall have a permanent name-plate, installed by the manufacturer, listing the U-factor, SHGC, Visible Transmittance and air leakage rate.

**H. UFC 4-010-01 Compliance:**

1. Provide system meeting UFC4-010-01, Appendix B Best Practices, ASTM F2248 Design Approach for Laminated Glazing Systems.
  - a. Level of Protection: Low/Medium
    - 1) Provide medium level of protection at assemblies containing door opening numbers 101a, 101b, and 143b.
    - 2) Provide low level of protection at all other assemblies not scheduled to receive medium level of protection above.
  - b. Applicable Blast Weight: 55 lbs

## **2.02 COMPONENTS**

**A. Aluminum Framing Members:** Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

1. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

**B. Glazing:** As specified in Section 088000.

## **2.03 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- C. Structural Supporting Anchors Attached to Reinforced Concrete Members: Design for welded attachment to weld plates embedded in concrete.
- D. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- E. Exposed Flashings: 0.040 inch (1 mm) thick aluminum sheet; finish to match framing members. Provide separation material between all adjacent dissimilar metals.
- F. Concealed Flashings: 0.018 inch (0.5 mm) thick galvanized steel and aluminum.
- G. Perimeter Sealant: Type II specified in Section 079005.
- H. Glazing: As specified in Section 08 8000.
- I. Glazing Accessories: As specified in Section 088000.
- J. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.
- K. Recycled Content: For aluminum products: Minimum Total Recovered Materials Content - 30%

## **2.04 FINISHES**

- A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 1.2 mil ; color and gloss as selected from manufacturer's standard line.
- B. Color: dark bronze to match adjacent facilities on the installation. Submit samples for approval by the Government prior to fabrication.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other related work.

- B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

### **3.02 INSTALLATION**

- A. Install curtain wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Structural Sealant Glazing (SSG) Adhesive: Install structural sealant glazing adhesive and weatherseal sealant in accordance with manufacturer's instructions.
- J. Install perimeter sealant in accordance with Section 079005.
- K. 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 0.5 inches per 100 ft (12 mm/30 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch (19 mm) and minimum of 1/4 inch (6 mm).

### **3.04 FIELD QUALITY CONTROL**

- A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.
- B. Water-Spray Test: Provide water spray quality test of installed curtain wall components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
  - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
  - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- C. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

### **3.05 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Remove excess sealant by method acceptable to sealant manufacturer.

### **3.06 PROTECTION**

- A. Protect installed products from damage until Date of Beneficial Occupancy.

### **END OF SECTION**

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## **SECTION 085200 - BLAST RESISTANT ALUMINUM WINDOW SYSTEMS**

### **PART I - GENERAL**

#### **1.01 SECTIONS INCLUDES**

- A. Architectural Aluminum Blast Resistant Window Systems, including perimeter trims, stools, accessories, shims, and anchors, and perimeter seating of window framing
- B. System depth: as required to meet UFC 4-010-01, Appendix B, ASTM F2248 Design Approach for Laminated Glass Glazing System
- C. Materials included in this section shall meet the requirements for LEED for New Construction points for the following Sections:
  - 1. MR Credit 4 - Recycled Content
  - 2. MR Credit 5 - Regional Materials
  - 3. The contractor is expected to understand the LEED requirements for these sections and include all applicable overhead in their base bid for the necessary documentation to achieve the above listed credits.
- D. Contractor's Option:
  - 1. Contractor shall provide specified aluminum framed curtain walls and entrance doors specified in this section and section 08 4113 for all curtain wall assemblies containing swinging entrances.
  - 2. At all other curtain wall applications, Contractor may provide blast resistant aluminum window systems as specified in this section or curtain wall assemblies specified in section 08 4413. Aluminum window systems to be finished to match curtain wall entrance systems.

#### **1.02 RELATED SECTIONS**

- A. Section 01 3514.01 - LEED Credit Summary
- B. Section 01 6000 - Product Requirements
- C. Section 01 7419 - Construction Waste Management and Disposal
- D. Section 05 1200 - Structural Steel Framing
- E. Section 05 5000 - Metal Fabrications
- F. Section 07 2500 - Weather Barriers

- G. Section 07 9200 - Joint Fillers - Joint Sealants
- H. Section 08 4413 - Glased Aluminum Curtain Walls
- I. Section 08 8000 - Glazing
- J. Section 09 2116 - Gypsum Board Assemblies

### **1.03 REFERENCES**

- A. UFC 4-010-01, Minimum Antiterrorism Standards for Buildings, Dated 12 December 2018.
- B. AAMA - American Architectural Manufacturers Association:
  - 1. AAMA/ WDMA/CSA 101/I.S.2/ A440-08 "Standard/Specification for windows, doors, and unit skylights".
  - 2. AAMA 502-12 "Voluntary Specification for Field Testing of Newly Installed Fenestration Products".
  - 3. AAMA 701/702-11 "Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals".
  - 4. AAMA 901-10 "Voluntary Specification for Rotary & Linear Operators in Window Applications".
  - 5. AAMA 902-07 "Voluntary Specification for Sash Balances".
  - 6. AAMA 904-09 "Voluntary Specification for Multi-bar Hinges in Window Applications".
  - 7. AAMA 910-10 "Voluntary - Life Cycle- Specifications and Test Methods for AW Class Architectural Windows and Doors".
  - 8. AAMA 920-11 "Specification for Operating Cycle Performance of Side-Hinged Exterior Door Systems".
  - 9. AAMA 1304-02 "Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems".
  - 10. AAMA 1503-09 "Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections".
  - 11. AAMA 2605-13 "Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels"

12. AAMA CW-10-12 "Care and Handling of Architectural Aluminum from Shop to Site"
13. AAMA 501.8-12 "Standard Test Method for Determination of Resistance to Human Impact of Window Systems Intended for Use in Psychiatric Applications".
14. AAMA 513-12 "Standard Laboratory Test Method for Determination of Forces and Motions Required to Activate Operable Parts of CW and AW Class Operable Windows, Sliding Glass Doors and Terrace Doors in Accessible Spaces"

**C. ASTM International:**

1. ASTM E90-09 "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements".
2. ASTM E283-12 "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen".
3. ASTM E330-14 "Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference".
4. ASTM E331-09 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference".
5. ASTM E547-09 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential".
6. ASTM E2190-10 "Standard Specification for Insulating Glass Unit Performance and Evaluation".
7. ASTM F588-07 "Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact".
8. ASTM D 532 "Standard Test Method for Specular Gloss.
9. ASTM D 1400 "Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal base.
10. ASTM D 1654 "Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

11. ASTM D 2244 "Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
  12. ASTM D 4214 "Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
  13. ASTM F2248 – “Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass”
- D. IGCC - Insulating Glass Certification Council:
- E. NFRC - National Fenestration Rating Council:
1. NFRC 100-2014 "Procedure for Determining Fenestration Product U Factors".
  2. NFRC 102-2014 "Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems".
- F. SGCC - Safety Glazing Certification Council:
1. ANSI Z97.1-09 "American National Standard for Safety Glazing Materials used in Buildings - Safety Performance Specifications and Methods of Test".
  2. 16 CFR 1201 "Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials - codified at Title 16, Part 1201 of the Code of Federal Regulations 2011 Edition".

#### **1.04 SUBMITTALS**

- A. See Section 01 3001 - Submittals
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples of a size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.
- E. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.

- F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- G. Structural Glazing Adhesive: Submit product data and calculations showing compliance with performance requirements
- H. Manufacturer's CertificateL Certify that the products supplied meet or exceed the specified requirements.
- I. Field Quality Control SubmittalsL Report of field Testing for water penetration and air leakage
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in the Government's name and registered with the Manufacturer.
- K. Sustainability Submittals, Product data for LEED Compliance:
  - 1. MR Credit 4 - Recycled Content
    - 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)
      - 2) Include total weight of products provided
  - 2. MR Credit 5: Regional Materials: Indicate distance from project site to:
    - a. Harvest/material extraction location
    - b. Manufacturing location.
    - c. Indicate percentage of the material harvested and manufactured within 500 miles of the project site.

## **1.05 QUALITY ASSURANCE**

- A. Designer Qualifications: Design window and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.

- C. Installer Qualifications: Skilled craftspeople who have demonstrated a successful history of installing windows for three years.

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

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-ups.
- B. Provide mock-up of one curtain wall unit including all Components, sealants, flashings, glazing, attachments, and anchorage.
- C. Locate on-site where directed by the Government; mock-up may remain as part of the Work.

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

- A. Store Products in manufacturer's unopened packaging until ready for installation.
- B. Handle and protect windows and accessories in accordance with AAMA CW-10-15 until project completion.

#### **1.08 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.
- B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### **1.09 WARRANTY**

- A. See Section 07 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 10 year period after Date of Beneficial Occupancy.
- C. Provide 10 year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide 20 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

#### **1.10 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.
- B. Contractor shall give preference to products extracted and / or manufactured within 500 miles of the project meeting the requirements of LEED MR Credit 5.

## **PART 2 - PRODUCTS**

### **2.01 FIXED WINDOW UNITS**

- A. Configuration:
  1. Fixed; glass plane in line with the window exterior plane.
  2. Fixed-to-fixed with a vertical integral mullion in one master frame; glass plane in line with the window exterior plane.
  3. Fixed-over-fixed with a horizontal integral mullion in one master frame; glass plane in line with the window exterior plane.
- B. Construction:
  1. Aluminum Extrusions: extruded by the window manufacturer from commercial quality 6063-T5 alloy; free from defects impairing strength and durability.
  2. Window Frame: Extruded aluminum with integral structural thermal break installed by the window manufacturer in the frame members; exterior and interior finishes applied by the window manufacturer; frames assembled by the window manufacturer.
    - a. Frame Depth: 3-1/4 Inches (83 mm). Advise the Government for coordination if required mullion depth exceeds 3-1/4 inches.
    - b. Fabricated with equal-leg frame.
    - c. Integral frame trim with snap cover for anchoring frame to structural framing to comply with UFC 4-010-01.
  3. Frame: Double tubular head, sill, and jambs miter cut and fastened with two zamac corner gussets per corner; corners sealed by window manufacturer with sealant conforming to AAMA 800-10.
  4. Integral Mullions: Double tubular integral mullion fastened with two Zamac gussets per frame member without penetrating the frame member with fasteners; joints sealed by window manufacturer with sealant conforming to AAMA 800-10.

5. Thermal Break: The thermal break separating the exterior and interior aluminum extrusions shall be a mechanical crimp-in-place system utilizing multi-directional glass fiber reinforced polyamide nylon ribbed struts with locking mechanical connections to the aluminum extrusions. The thermal break shall not be compromised by hardware or metal fasteners.
  6. Glazing: exterior foam gasket; insulated glazing units as indicated on the drawings and in Section 08 8000; two weep holes under each glass pocket for drainage with hooded weeps painted to match the window finish; foam backer rod and silicone heel bead forming an internal seal; interior bulb gasket threaded into aluminum glazing beads; specified glass glazed by the window manufacturer.
- C. Recycled Content: For aluminum products: Minimum Total Recovered Materials Content - 30%
- D. Performance Requirements:
1. Design and size components to withstand the following load requirements without damage or permanent set.
    - a. Design Wind Loads: Comply with the requirements of IBC 2015 code.
      - 1) Measure performance by testing in accordance with ASTM E330/E330M, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
      - 2) Member Deflection: For spans less than 13 feet 6 inches (4115 mm), limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch (19 mm), whichever is less and with full recovery of glazing materials.
      - 3) Member Deflection: For spans over 13 feet 6 inches (4115 mm) and less than 40 feet (12.2 m), limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch (1/240 of span plus 6.4 mm), with full recovery of glazing materials.
    - b. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
    - c. Movement: Accommodate the following movement without damage to components or deterioration of seals:
      - 1) Expansion and contraction caused by 180 degrees F (82 degrees C) surface temperature.



- 2) Expansion and contraction caused by cycling temperature range of 170 degrees F (77 degrees C) over a 12 hour period.
  - 3) Movement of curtain wall relative to perimeter framing.
  - 4) Deflection of structural support framing, under permanent and dynamic loads.
2. AAMA Certification: Conformance to AW-PG90-FW specifications in AAMA/WDMA/CSA 101/I.S.2/A440-08 when tests are performed on the prescribed 60 inches by 99 inches (1524 mm by 2515 mm) minimum test size with the following test results:
    3. Air Infiltration: Not to exceed AAMA 101 standard of maximum 0.1 cfm/square foot when tested per ASTM E283-12 at a static air pressure difference of 6.24 psf.
    4. Water Penetration: No uncontrolled water leakage when tested per ASTM E331-09 and ASTM E547-09 at a static air pressure difference of 15 psf.
    5. Uniform Deflection: No more than L/175 when tested per ASTM E330-14 at a static air pressure difference of 90 psf.
    6. Uniform Structural Load: No glass breakage or permanent damage to fasteners, and maximum .2% permanent deformation of the span of any frame member when tested per ASTM E330-14 at a static air pressure difference of 135 psf.
    7. Forced-entry Resistance: Reasonable security against forced entry and the test window shall achieve a Grade 40 when tested per ASTM F588-07.
- E. UFC 4-010-01 Compliance:
1. Provide system meeting UFC 4-010-01, Appendix B Best Practices, ASTM F2248 Design Approach for Laminated Glazing Systems.
  2. Level of Protection: Low
  3. Applicable Blast Weight: 55 lbs.
- F. Thermal NFRC Simulation: Thermal computer simulation per NFRC 100-2010 on a 60 inches by 99 inches (1524 mm by 2515 mm) test size glazed with 1 inch (25 mm) insulating made with 1/4 inch (6 mm) soft coat low E coating on surface #2, argon gas in the airspace made with a stainless steel spacer, and 1/4 inch (6 mm) clear glass, with the following test result:
1. Standardized Thermal Transmittance to be maximum 0.297 btu/hr/sq.ft/degree F.

- G. Thermal AAMA Testing: Per AAMA 1503-09, on a 47 inch by 59 inches (1194 mm by 1499 mm) test size glazed with 1 inch (25 mm) insulating glass made with 1/4 inch (6 mm) soft coat low E coating on surface #2, plain air in the airspace made with a stainless steel spacer, and 1/4 inch (6 mm) clear glass, with the following test results:
1. Condensation Resistance Factor: minimum 71 frame CRF and 72 glass CRF.
  2. Thermal Transmittance: maximum 0.35 btu/hr/sq.ft/degree F U value.
- H. Thermal NFRC Testing: Per NFRC 102-2010 on a 47 inch by 59 inches (1194 mm by 1499 mm) test size glazed with 1 inch (25 mm) insulating glass made with 1/4 inch (6 mm) soft coat low E coating on surface #2, plain air in the airspace made with a stainless steel spacer, and 1/4 inch (6 mm) clear glass, with the following test result:
1. Standardized Thermal Transmittance to be maximum 0.34 btu/hr/sq.ft/degree F.
- I. Acoustical Testing: per ASTM E90-09 on a 46-1/4 inches x 59 inches (1175 mm x 1499 mm) test size glazed with 1-3/8 inches (35 mm) insulating glass made with exterior 5/16 (7.9 mm) laminated glass - 1/8 inch (3 mm) glass x .060 inch (1.5 mm) PVB interlayer x 1/8 inch (3 mm) glass - and 13/16 inch (20.6 mm) airspace and interior 1/4 inch (6 mm) laminated glass - 1/8 inch (3 mm) glass x .030 inch (0.76 mm) PVB interlayer x 1/8 inch (3 mm) glass: minimum 40 STC and 31 OITC.

## **2.02 INSTALLATION ACCESSORIES**

- A. Material: Extruded aluminum; nominal .062 inch (1.6 mm) wall; with exposed surfaces finished to match window color and finish performance; concealed fasteners; required weather seals; designed for unrestricted expansion and contraction.

## **2.03 ACCESSORIES:**

- A. G2SA-BF, G200 Subsill for Blast Frame
- B. Closure Cap
- C. G200 Blast Frame 3 Piece Mullion
- D. Exposed Flashings: [0.040] inch ([1] mm) thick aluminum sheet; finish to match framing members. Provide separation material between all adjacent dissimilar metals.
- E. Perimeter Sealant: Type [II] specified in Section 07 9005 - Joint Sealants
- F. Mullions:
1. Horizontal stack mullion with polyamide strip thermal break.
  2. Vertical three-piece mullion with polyamide strip thermal break

**G. Extruded Aluminium Partition Closure**

1. Basis of Design: Mullion Mate manufactured by Gordon Interior Specialties Division, Gordon, Inc. 800-877-8746
2. Description: extruded aluminum partition closures are pre-assembled and spring loaded to provide a tight fit for vertical junctures of partitions and window walls. Finished to match mullions in a spray applied water-borne cross-linked baked acrylic finish or Acrylic-Polyester hybrid powder coat paint finish or custom paints or anodized finish. They are sound tested to a composite STC of 35 with acoustical batts for sound attenuation.
3. Materials:
  - a. Aluminum extrusions: 6063-T5 temper, tensile strength 31 KSI (ASTM B 221, ASTM B 221 M).
  - b. Acoustical Batts for sound attenuation (as specified).
  - c. Accessories:
    - 1) End Caps - 4 7/8" extruded end caps
  - d. General: Provide metals free from surface blemishes where exposed to view in finished unit. Surfaces that exhibit pitting, seam marks, roller marks, stains, and discolorations, or other imperfections on finished units are not acceptable. All metal shall be of the highest-grade commercial type.
4. Finishes:
  - a. Acrylic-Polyester hybrid powder coat paint finish available in a variety of standard or custom colors.
5. Location: Between Rooms 106 & 107, and 109 & 110.

**2.04 INSULATING GLASS UNITS**

- A. Refer to Section 08 8000 - Glazing

**2.05 FINISH ON EXTERIOR ALUMINUM EXTRUSIONS**

- A. Application: on clean extrusions free from objectionable surface blemishes; on exposed surfaces visible when installed product's operating sash is closed. Electrostatic spray by an Approved Applicator and appropriate oven bake process.
- B. Coating: Superior Performance Powder coating: One-coat dry system with resin containing fluoropolymer; thermosetting; alternative finishes will not be acceptable.

- C. Quality Standard: Conforming to AAMA 2605-13, including 10 years Florida exposure.
- D. Pretreatment: Mechanically clean and chemically pretreat fabricated items in accordance with coating manufacturer's requirements and AAMA requirements with a Chrome Free Treatment.
- E. Coating Quantity: One single color coating, additional coating quantities will not be accepted. This includes, but is not limited to barrier coats, primers and clear coats.
- F. Dry Film Thickness: Eighty percent of measurements on primary exposed surfaces shall exceed 1.9 mils with a standard thickness range of 1.9 to 3.14 mils, except inside corners and channels.
- G. Environmental Factors: Less than 3% harmful VOC's (Volatile Organic Compounds) emitted during powder coating application process.
- H. Color: Custom Color to be selected by the Government.
  - 1. Quality Standard: Conforming to AAMA 2605.
  - 2. Color to match approved finish for curtain wall framing and entrances specified in section 08 4413
- I. Touch-up Materials: As recommended by coating manufacturer for field applications.

## **2.06 FINISH ON INTERIOR ALUMINUM EXTRUSIONS**

- A. Application: on clean extrusions free from objectionable surface blemishes; on exposed surfaces visible when installed product's operating sash is closed. Electrostatic spray by an Approved Applicator and appropriate oven bake process.
- B. Coating: Superior Performance Powder coating: One-coat dry system with resin containing 70% fluoropolymer; thermosetting; alternative finishes will not be acceptable.
- C. Quality Standard: Conforming to AAMA 2605-13, including 10 years Florida exposure. [AAMA 2604-13, including 5 years Florida exposure.]
- D. Pretreatment: Mechanically clean and chemically pretreat fabricated items in accordance with coating manufacturer's requirements and AAMA requirements with a Chrome Free Treatment.
- E. Coating Quantity: One single color coating, additional coating quantities will not be accepted. This includes, but is not limited to barrier coats, primers and clear coats.

- F. Dry Film Thickness: Eighty percent of measurements on primary exposed surfaces shall exceed 1.9 mils with a standard thickness range of 1.9 to 3.14 mils, except inside corners and channels.
- G. Environmental Factors: Less than 3% harmful VOC's (Volatile Organic Compounds) emitted during powder coating application process.
- H. Color: Custom Color to be selected by the Government.
  - 1. Quality Standard: Conforming to AAMA 2604.
  - 2. Color to match approved finish for curtain wall framing and entrances specified in section 08 4413

### **PART 3 - INSTALLATION**

#### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify the Government of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Prepare openings to be in tolerance, plumb, level, provide for secure anchoring, and in accordance with approved shop drawings.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.03 INSTALLATION**

- A. Install windows in accordance with approved shop drawings and window manufacturer's recommendations with skilled craftspeople who have demonstrated a successful history of installing windows for a specified number of years. Provide required support and securely fasten and set windows plumb, square, and level without twist or bow. Install in proper relationship with adjacent construction.
- B. Apply sealant per sealant manufacturer's recommendations at joints, wipe off excess, and leave exposed sealant surfaces clean and smooth.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Provide thermal isolation where components penetrate or disrupt building insulation.

- E. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- F. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- G. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- H. Install perimeter sealant in accordance with Section 07 9005
- I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.04 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 0.5 inches per 100 ft (12 mm/30 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch (19 mm) and minimum of 1/4 inch (6 mm).

### **3.05 FIELD TESTING**

- A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.
- B. Water-Spray Test: Provide water spray quality test of installed curtain wall components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
  - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
  - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- C. Select test units as directed by the the Government and use an AAMA-accredited laboratory provided by the Government or Contractor.
- D. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

### **3.06 ADJUSTING**

### **3.07 CLEANING**

- A. Peel the Preserve protective film from the window or door glass surfaces when the window or door installation is complete, leaving these surfaces ready for use without the need for glass cleaning.
- B. Leave the installed windows and doors clean and free of construction debris.

### **3.08 PROTECTION**

- A. Protect installed products until Beneficial Occupancy.
- B. Touch-up, repair or replace damaged products before Beneficial Occupancy.

### **END OF SECTION**

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## **SECTION 087100 - DOOR HARDWARE**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Hardware for wood and hollow steel doors.
- B. Lock cylinders for doors for which hardware is specified in other sections.
- C. Thresholds.
- D. Weatherstripping, seals and door gaskets.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 2300 – Bid Options
- B. Section 08 1113 - Hollow Metal Doors and Frames.
- C. Section 08 1416 - Flush Wood Doors.
- D. Section 08 3600 – Sectional Overhead Doors
- E. Section 08 4113 - Aluminum-Framed Entrances and Storefronts
- F. Section 08 4313- Aluminum Framed Storefronts
- G. Section 08 4413 - Glazed Aluminum Curtain Walls: Hardware for integral doors and frames except lock cylinders; installation of cylinders.

#### **1.03 REFERENCE STANDARDS**

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. BHMA A156.1 - American National Standard for Butts and Hinges; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.1).
- C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; Builders Hardware Manufacturers Association; 2011 (ANSI/BHMA A156.2).
- D. BHMA A156.3 - American National Standard for Exit Devices; Builders Hardware Manufacturers Association; 2008 (ANSI/BHMA A156.3).
- E. BHMA A156.4 - American National Standard for Door Controls - Closers; Builders Hardware Manufacturers Association, Inc.; 2008 (ANSI/BHMA A156.4).

- F. BHMA A156.5 - American National Standard for Auxiliary Locks & Associated Products; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.5).
- G. BHMA A156.6 - American National Standard for Architectural Door Trim; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.6).
- H. BHMA A156.7 - American National Standard for Template Hinge Dimensions; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.7).
- I. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; Builders Hardware Manufacturers Association, Inc.; 2010 (ANSI/BHMA A156.8).
- J. BHMA A156.12 - American National Standard for Interconnected Locks & Latches; Builders Hardware Manufacturers Association; 2005 (ANSI/BHMA A156.12).
- K. BHMA A156.13 - American National Standard for Mortise Locks & Latches; Builders Hardware Manufacturers Association; 2005 (ANSI/BHMA A156.13).
- L. BHMA A156.16 - American National Standard for Auxiliary Hardware; Builders Hardware Manufacturers Association; 2008 (ANSI/BHMA A156.16).
- M. BHMA A156.18 - American National Standard for Materials and Finishes; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.18).
- N. BHMA A156.21 - American National Standard for Thresholds; Builders Hardware Manufacturers Association; 2009 (ANSI/BHMA A156.21).
- O. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems; Builders Hardware Manufacturers Association; 2012 (ANSI/BHMA A156.22).
- P. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.
- Q. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.
- R. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADAAG - Americans with Disabilities Act, Accessibility Guidelines).
- S. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.
- T. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute; 1993; also in WDHS-1/WDHS-5 Series, 1996.

- U. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2012.
- V. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
- B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- C. Convey the Government's keying requirements to manufacturers.

#### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
- C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
- D. Keying Schedule: Submit for approval of the Contracting Officer Representative.
- E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- F. Keys: Deliver with identifying tags to Government by security shipment direct from hardware supplier.
- G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in the Government's name and registered with manufacturer.
- H. Maintenance Materials and Tools: Furnish the following for Government use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Lock Cylinders: Ten for each master keyed group.

3. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience.

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

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

#### **1.08 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide 10-year warranty for door closers.
- C. All other door hardware components to have a one-year limited warranty.

### **PART 2 PRODUCTS**

#### **2.01 DOOR HARDWARE - GENERAL**

- A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide all items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
  1. Applicable provisions of federal, state, and local codes.
  2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
  3. Applicable provisions of NFPA 101, Life Safety Code.
  4. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.
- D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.

- E. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.
- F. Finishes: Identified in schedule.

## **2.02 HINGES**

- A. Hinges: Provide hinges on every swinging door.
  - 1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
  - 2. Provide ball-bearing hinges at all doors having closers.
  - 3. Provide hinges in the quantities indicated.
  - 4. Provide non-removable pins on exterior outswinging doors.
  - 5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.
- B. Butt Hinges: Comply with BHMA A156.1 and A156.7; standard weight, unless otherwise indicated.
  - 1. Provide hinge width required to clear surrounding trim.
- C. Quantity of Hinges Per Door:
  - 1. Doors up to 60 inches (1.5 m) High: Two hinges.
  - 2. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.
  - 3. Doors 90 inches (2.3 m) High up to 120 inches (3 m) High: Four hinges.
  - 4. Doors over 120 inches (3 m) High: One additional hinge per each additional 30 inches (762 mm) in height.
  - 5. Dutch Doors: Two hinges each leaf.

## **2.03 PUSH/PULLS**

- A. Push/Pulls: Comply with BHMA A156.6.
  - 1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
  - 2. On solid doors, provide matching push plate and pull plate on opposite faces.

## **2.04 LOCKS AND LATCHES**

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
  - 1. Hardware Sets indicate locking functions required for each door.
  - 2. If no hardware set is indicated for a swinging door provide an office lockset.
  - 3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
  - 4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
  - 1. Provide cams and/or tailpieces as required for locking devices required.
- C. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer.
  - 1. Stanley Best (BE): Provide all cylinders and keying system from Best in order to match the current Government Best Access MX-8 keying system.
  - 2. Ensure all door hardware provided is compatible with and capable of receiving specified Best Access system core/cylinder.
  - 3. Substitutions not allowed.
- D. Keying: as approved by Contracting Officer in approved keying schedule..
  - 1. Key to existing keying system.

## **2.05 MORTISE LOCKSETS**

- A. Locking Functions: As defined in BHMA A156.13, and as follows:
  - 1. Passage: F01.
  - 2. Privacy: F19, or F02 with retraction of deadbolt by use of inside lever/knob.
  - 3. Office: F04, key not required to lock, remains locked upon exit.
- B. Ensure all locksets are compatible with and able to receive best access core/cylinder.

## **2.06 FLUSHBOLTS**

- A. Flushbolts: Lever extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.
  - 1. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
  - 2. Floor Bolts: Provide dustproof strike except at metal thresholds.
- B. Manual Flushbolts: Provide lever extensions for top bolt at over-size doors.

## **2.07 EXIT DEVICES**

- A. Locking Functions: Functions as defined in BHMA A156.3, and as follows:
  - 1. Entry/Exit, Always-Unlocked: Outside lever unlocked, no outside key access, no latch holdback.
  - 2. Entry/Exit, Free Swing: Key outside retracts latch, latch holdback (dogging) for free swing during occupied hours, not fire-rated; outside trim must be specified as lever or pull.
- B. Ensure all exit devices are compatible with and able to receive best access core/cylinder.

## **2.08 CLOSERS**

- A. Closers: Complying with BHMA A156.4.
  - 1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
  - 2. Provide a door closer on every exterior door.
  - 3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
  - 4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.

## **2.09 STOPS AND HOLDERS**

- A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
  - 1. Provide wall stops, unless otherwise indicated.

2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

## **2.10 GASKETING AND THRESHOLDS**

### **A. Gaskets: Complying with BHMA A156.22.**

1. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
2. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
  - a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.
3. On each exterior door, provide door bottom sweep, unless otherwise indicated.

### **B. Thresholds:**

1. At each exterior door, provide a threshold unless otherwise indicated.
2. Field cut threshold to frame for tight fit.

### **C. Fasteners At Exterior Locations: Non-corroding.**

## **2.11 PROTECTION PLATES AND ARCHITECTURAL TRIM**

### **A. Protection Plates:**

1. Kickplate: Provide on push side of every door with closer, except storefront and all-glass doors.
2. Mop Plates:

## **2.12 KEY CONTROLS**

- A. Key Management System: For each keyed lock on project, provide one set of consecutively numbered duplicate key tags with hanging hole and snap catch.
- B. Facility Manager's Key Cabinet: Sheet steel construction, piano hinged door with key lock.



1. Mounting: Wall-mounted.
  2. Capacity: Actual quantity of keys, plus 25 percent additional capacity.
  3. Horizontal metal hook strips with replaceable labels covered with clear plastic.
  4. Size key hooks to hold 6 keys each.
  5. Finish: Baked enamel, color as selected.
  6. Key cabinet lock to building keying system.
- C. Fire Department Lock Box: Heavy-duty, surface mounted, solid stainless-steel box with hinged door and interior gasket seal; single drill resistant lock with dust covers and tamper alarm.
1. Capacity: Holds 10 keys.
  2. Finish: Manufacturer's standard dark bronze.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

### **3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Do not install surface mounted items until finishes applied to substrate are complete.
- D. Mounting heights for hardware from finished floor to center line of hardware item:
1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
  2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

### **3.03 FIELD QUALITY CONTROL**

- A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

### **3.04 ADJUSTING**

- A. Adjust work under provisions of Section 01 7000.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

### **3.05 CLEANING**

- A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

### **3.06 PROTECTION**

- A. Protect finished Work under provisions of Section 01 7000.
- B. Do not permit adjacent work to damage hardware or finish.

## HARDWARE SETS

### Set: 1.0

Doors: 121b, 143b

Description: EXT PR - ALUM

2	Pivot Set	195	626	RF
2	Pivot	M19	626	RF
1	Exit Device	70 AD8610 106 x 862	US32D	SA
1	Concealed Vert Rod Exit, Exit Only	AD8610 EO	US32D	SA
1	Best Cylinder	MX-8 as required	626	BE
2	Door Pull	BF168	US32D	RO
2	Door Closer	CLP7500	689	NO
2	Mtg Plate	as required	689	NO
2	Door Stop	467	Black	RO
1	Threshold	171AK MSES25SS		PE

Notes: Doors to meet impact code - UFC4-010-01.  
Verify hardware with door supplier

### Set: 2.0 - Omitted

### Set: 3.0

Doors: 150b, 150c

Description: ENTRY - AL

1	Pivot Set	195	626	RF
1	Pivot	M19	626	RF
1	Storeroom Lock	70 8204 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Door Closer	CLP7500	689	NO
1	Mtg Plate	as required	689	NO
1	Door Stop	467	Black	RO
1	Threshold	1715AK MSES25SS		PE

1	Rain Guard	346C		PE
1	Sweep	57AV		PE
Notes: Doors to meet impact code – UFC 4-010-01. Verify hardware with door supplier				
<b>Set: 4.0</b>				
Doors: 134				
Description: Mech				
3	Hinge	TA2714 4-1/2" x4-1/2"	US26D	MK
1	Storeroom Lock	70 8204 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Stop [Wall / floor]	409 /442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 5.0 - Omitted</b>				
<b>Set: 6.0 - Omitted</b>				
<b>Set: 7.0</b>				
Doors: 130a, 138, 150a				
Description: DATA				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom Lock	70 8204 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Door Closer	7500	689	NO
1	Stop [wall / floor]	409 / 442	US32D	RO
3	Silencer	608		RO
1	Gasketing	S88BL		PE
<b>Set: 8.0</b>				
Doors: 123				

Description: MECH				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom Lock	70 8204 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Door Closer	7500	689	NO
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 9.0</b>				
Doors: 124				
Description: JAN				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom Lock	70 8204 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Door Closer	7500	689	NO
1	Kick Plate	K1050 4" x 1" LDW	US32D	RO
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 10.0</b>				
Doors: 130				
Description: ENTRY				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Pushbutton Lock	L1000 series		SI
1	Best Cylinder	MX-8 as required	626	BE
1	Door Closer	7500	689	NO
1	Kick Plate	K1050 10" x 1.5" LDW	US32D	RO
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 11.0</b>				

Doors: 126, 140				
Description: RESTROOM				
3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Door Pull	BF168	US32D	RO
1	Push Plate	70C	US32D	RO
1	Door Closer	7500	689	NO
1	Kick Plate	K1050 4" x 1" LDW	US32D	RO
1	Kick Plate	K1050 10" x 1.5" LDW	US32D	RO
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 12.0</b>				
Doors: 146				
Description: ENTRY - RATED				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Exit Device	12 70 8813 ETL	US32D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Door Closer	7500	689	NO
1	Kick Plate	K1050 10" x 1.5" LDW	US32D	RO
2	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 13.0</b>				
Doors: 144, 147				
Description: CLASS				
6	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
2	Flush Bolt Set	2845	US26D	RO
1	Dust Proof Strike	570	US26D	RO
1	Classroom Lock	70 8237 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE

2	Stop [wall / floor]	409 / 442	US32D	RO
1	Closer			
1	Coordinator			
1	Gasketing	S88BL		PE
<b>Set: 14.0 - Omitted</b>				
<b>Set: 15.0 - Omitted</b>				
<b>Set: 16.0</b>				
Doors: 122, 125, 127, 131, 133b, 133c, 135, 139, 141				
Description: OFFICE				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Office Lock	70 8205 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Stop [wall / floor]	409 / 442	US32D	RO
3	Silencer	608		RO
<b>Set: 17.0 - Omitted</b>				
<b>Set: 18.0</b>				
Doors: 133a				
Description: WAITING				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Office Lock	70 8205 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE

<b>Set: 19.0</b>				
Doors: 129a, 129b, 130b, 145				
Description: CLASS				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Classroom Lock	70 8237 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 20.0</b>				
Doors: 148b				
Description: TOILET				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Set	49 8265 LNL	US26D	SA
1	Kick Plate	K1050 4" x 1" LDW	US32D	RO
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 21.0</b>				
Doors: 132				
Description: TOILET				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Set	49 8265 LNL	US26D	SA
1	Surface Overhead Stop	10-X36	689	RF
1	Kick Plate	K1050 4" x 1" LDW	US32D	RO
1	Gasketing	S88BL		PE



<b>Set: 22.0</b>				
Doors: 137				
Description: BREAK				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Passage Set	8215 LNL	US26D	SA
1	Kick Plate	K1050 4" x 1" LDW	US32D	RO
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Gasketing	S88BL		PE
<b>Set: 23.0</b>				
Doors: 151				
Description: EXT - STOR				
3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom Lock	70 8204 LNL	US26D	SA
1	Best Cylinder	MX-8 as required	626	BE
1	Door Closer	CLP7500	689	NO
1	Stop [wall / floor]	409 / 442	US32D	RO
1	Threshold	171AK MSES25SS		PE
1	Gasketing	S88BL		PE
1	Rain Guard	346C		PE
1	Sweep	57AV		PE
<b>Set: 24.0 - Omitted</b>				
<b>Set: 25.0</b>				
Doors: 150d				
Description: OH DOOR				
1	Best Cylinder	MX-8 as required	626	BE
Notes: Balance of hardware by door mfg				

<b>Set: 26.0</b>				
Doors: 148a				
Description: VAULT				
3	All hardware	By door mfg		
<b>Set: 27.0</b>				
Doors: 121a, 143a				
Description: CORR PR				
6	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Exit Device	12 NB8715 ETL	US32D	SA
1	Exit Device	12 NB8710 ETL	US32D	SA
2	Door Closer	7500	689	NO
2	Kick Plate	K1050 10" x 1.5" LDW	US32D	RO
1	Gasketing	S88BL		PE
2	Silencer	608		RO

**END OF SECTION**

## **SECTION 088000 - GLAZING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Glass.
- B. Fitness Mirrors
- C. Glazing compounds and accessories.
- D. Materials included in this section shall achieve LEED for New Construction v2009 points for the following credits:
  - 1. MR Credit 4 Recycled Content
  - 2. MR Credit 5 Regional Materials
  - 3. IEQ Credit 4.1 Low-Emitting Materials-Adhesives and Sealants
  - 4. The contractor is expected to understand the LEED documentation requirements for these credits 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 079005 - Joint Sealers: Sealant and back-up material.
- B. Section 081213 - Hollow Metal Frames: Glazed borrowed lites.
- C. Section 081416 - Flush Wood Doors: Glazed lites in doors.
- D. Section 08 4113 - Aluminum Framed Entrances
- E. Section 08 4313 - Aluminum Framed Storefronts
- F. Section 08 4413 - Glazed Aluminum Curtain Walls.
- G. Section 08 5200 - Blast Resistant Aluminum Window Systems
- H. Section 102800 - Toilet, Bath, and Laundry Accessories: Mirrors.

#### **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; 2019.
- G. GANA (GM) - GANA Glazing Manual; 2022.
- H. GANA (SM) - GANA Sealant Manual; 2008.
- I. GANA (LGRM) - Laminated Glazing Reference Manual; 2019.
- J. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (Reaffirmed 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 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Samples: Submit two samples 12 by 12 inch (305 by 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.

## **1.08 SUSTAINABILITY REQUIREMENTS**

- A. Contractor shall endeavor to provide materials with a high recycled content which contribute to the project's overall recycled content goal.
- B. Contractor shall endeavor to provide materials with the lowest possible VOC content.
- C. Contractor shall give preference to product extracted and / or manufactured within 500 miles of the project site meeting the requirements of IEED MR Credit 5.

## **PART 2 PRODUCTS**

### **2.01 INSULATING GLASS UNITS**

- A. Type [IG-1] - Blast Resistant, Solar Control, Laminated Insulating Glass Units: Vision glass, double glazed.
  - 1. Application: All exterior glazing unless otherwise indicated.
  - 2. Performance Requirements:
    - a. Blast Mitigation Performance: Shall be tested or proven through analysis to meet ASTM F1642, GAS-TS01, and UFC 04-010-01 performance criteria
      - 1) To meet UFC 04-010-01, B-3.1 Standard 10 for Windows and Skylights, the following options are available:
        - (a) Section B-3.1.3 ASTM F3348 Design Approach
    - b. Winter U-Value: 0.28
    - c. Solar Heat Gain Coefficient: 0.25
    - d. VLT (%): 33
  - 3. Outdoor Lite:

- a. Glass Thickness: (1/4") 6 mm, minimum type as required for blast resistance requirements.
  - b. Tint and Coating: Gray tint 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. Indoor Lite: Laminate as required for blast resistance requirements.
- a. Laminate Outboard Lite:
    - 1) Glass Thickness: (1/8") 3 mm +/- as required for blast resistance requirements.
    - 2) Tint: Clear
    - 3) Heat-Treatment: Tempered and Heat Strengthened as mandated for safety and by code.
  - b. Interlayer:
    - 1) Type: PVB
    - 2) Thickness: minimum as required for blast resistance requirements.
    - 3) Color: Clear
  - c. Laminate Inboard Lite:
    - 1) Glass Thickness: (1/8") 3 mm +/- as required for blast resistance requirements.
    - 2) Tint: Clear
    - 3) 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: locations indicated on the drawings.
  - 2. Type: Fully tempered float glass.

3. Tint: Clear.
  4. Thickness: 1/4 inch (6 mm).
- B. Type S-2 - Obscure Glazing: Translucent, showing shadows but not forms.
1. Application: Locations indicated on the drawings.
  2. Type: Patterned glass, fully tempered.
  3. Tint: Clear.
  4. Thickness: 1/4 inch (6 mm), nominal.

### **2.03 FITNESS MIRROR**

- A. At locations indicated on the drawings, provide continuous mirror assemblies as described below:
1. Materials: 1/4" thick polished plate mirror with safety backing per CFR 1201.
  2. Size: Provide manufacturer's standard sizes as required for each application, or run. Refer to floor plans. Field verify and coordinate required standard units sizes needed to make up each run of mirrors.
    - a. Minimum unit width: 36"
    - b. Maximum unit width: manufacturer's maximum available.
    - c. Height: 6'-0"
  3. Provide polished edges on all sides suitable for butt joint installation application.
  4. Provide stainless steel channel on all four sides of each run of mirrors (refer to plans). Provide polished edge butt joint at joints between mirror units within each run.
  5. Mechanically fasten mirror to wall substrate.

### **2.04 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.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
1. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
  2. Interlayer: Poly-Vinyl- Butyl - as required to meet blast resistance requirements.
- C. Patterned Glass: Cast or molded glass.

## **2.05 PLASTIC FILMS**

- A. Plastic Film: triple-silver, magnetron sputter vacuum deposition (MSVD) type, visible light transmittance of 64 percent, NRFC U-Value of 0.24, and solar heat gain coefficient (SHGC) of 0.27 when paired with clear glass.

## **2.06 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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