

**NEW WARTHOG ENCLOSURE BUILDING  
AT  
FRESNO CHAFFEE ZOO**

894 W. Belmont Ave, Fresno, CA 93728

Fresno, CA

**PROJECT MANUAL**



**March 29, 2017**

**1616**

**1616 FRESNO CHAFFEE ZOO  
NEW WARTHOG & TURTLE EXHIBIT ENCLOSURE**

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**SECTION 01 7419**  
**CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 GENERAL**

**1.01 WASTE MANAGEMENT REQUIREMENTS**

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, 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.
- E. 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.
- F. 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 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., ignitability, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitability, 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.

### **1.03 SUBMITTALS**

- A. See Administrative Requirements, for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
  2. Submit Report on a form acceptable to Owner.
  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. Incinerator 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 delivered to incinerators.
    - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
    - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

5. 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.
6. 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.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

## **2.01 WASTE MANAGEMENT PLAN IMPLEMENTATION**

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
  1. Pre-bid meeting.
  2. Pre-construction meeting.
  3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
  1. Provide containers as required.
  2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
  3. 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**

**SECTION 01 7823**  
**OPERATION AND MAINTENANCE DATA**

**1.01 REQUIREMENTS INCLUDED**

- A. Compile product data and related information appropriate for Owner's maintenance and operation of all equipment and products furnished under the Contract. These requirements include, but are not limited to, the following electric/electronic systems:
  - 1. Building Automation System (Direct Digital Controls) and all HVAC Equipment
  - 3. Light Fixtures, Transformers, and other Electrical Equipment
  - 4. Fire Alarm System
  - 5. Intrusion Detection System
- B. Furnish any special tools provided by manufacturer for such maintenance and operation.
- C. Instruct Owner's personnel in operation of equipment and systems.

**1.02 RELATED REQUIREMENTS**

**1.03 FORM OF SUBMITTALS**

- A. Prepare data in form of an instructional manual for use by Owner's personnel. Prepare three copies of complete manual in final form.
- B. Format:
  - 1. Size: 8-1/2 x 11 inches.
  - 2. Text: Manufacturer's printed data, or neatly typewritten.
  - 3. Drawings:
    - a. Provide reinforced punched binder tab, bind in with text.
    - b. Fold larger drawings to size of text pages.
  - 4. Provide fly-leaf for each separate product, or each piece of operating equipment.
    - a. Provide typed description of product, and major component parts of equipment.
    - b. Provide indexed tabs.
  - 5. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List the following:
    - a. Title of Project
    - b. Identity of separate structure as applicable.
    - c. Identity of general subject matter covered in the manual.
  - 6. Sequence: provide a Table of Contents, organizing Data by sequential specification section.
- C. Binders:
  - 1. Commercial quality three-ring binders with durable and cleanable plastic covers.
  - 2. Maximum ring size: 1 1/2 inch.
  - 3. When multiple binders are used, correlate the data into related consistent groupings.

#### **1.04 CONTENT OF MANUAL**

- A. Neatly typewritten table of contents for each volume, arranged in systematic order.
  - 1. Contractor, name of responsible principal, address and telephone number.
  - 2. A list of each product required to be included, indexed to content of the volume.
  - 3. List, with each product, name, address and telephone number of:
    - a. Subcontractor or Installer
    - b. Maintenance Contractor, as appropriate.
    - c. Identify area of responsibility of each.
    - d. Local source of supply for parts and replacement.
  - 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
  - 1. Include only those sheets which are pertinent to the specific product.
  - 2. Annotate each sheet to:
    - a. Clearly identify specific product or part installed.
    - b. Clearly identify data applicable to installation.
    - c. Delete references to inapplicable information.
- C. Drawings:
  - 1. Supplement product data with Drawings as necessary to clearly illustrate:
    - a. Relations of component parts of equipment and systems.
    - b. Control and flow diagrams.
  - 2. Coordinate Drawings with information in Project Record Documents to assure correct illustration of completed installation.
  - 3. Do not use Project Record Documents as maintenance drawings.
- D. Written text, as required to supplement product data for the particular installation:
  - 1. Organize in consistent format under separate headings for different procedures.
  - 2. Provide logical sequence of instructions for each procedure.
- E. Copy of each warranty and service contract issued.
  - 1. Provide information sheet for Owner's personnel, indicating:
    - a. Proper procedures in event of failure.
    - b. Instances which might affect validity of warranties.
- F. Other information required by pertinent sections of the Project Manual.

#### **1.05 INSTRUCTION OF OWNER'S PERSONNEL**

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.
- B. Operating and maintenance manuals shall constitute the basis of instruction.
  - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

\* \* \* \* \*

## SECTION 07 5300 ELASTOMERIC MEMBRANE ROOFING

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Elastomeric roofing membrane, adhered conventional application.
- B. Insulation, flat and tapered.
- C. Vapor retarder.
- D. Deck sheathing.
- E. Flashings.
- F. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

#### 1.02 RELATED REQUIREMENTS

#### 1.03 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2011be1.
- B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2008.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2012.
- D. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers- Tension; 2006a.
- E. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2012).
- F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- G. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2012.
- H. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces; 2011.
- I. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene a pre-installation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

#### 1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
  - 1. LEED Submittal: Include testing documentation of solar reflectance index.

- C. Shop Drawings: Indicate joint or termination detail conditions and conditions of interface with other materials.
- D. Samples for Verification: Submit two samples 4 x 4 inches (\_\_\_\_ x \_\_\_\_ mm) in size illustrating insulation.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years experience and approved by manufacturer.

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

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Protect foam insulation from direct exposure to sunlight.

#### **1.08 FIELD CONDITIONS**

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F (5 degrees C) or above \_\_\_\_ degrees F (\_\_\_\_ degrees C).
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

#### **1.09 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide 15 year manufacturer's material and labor warranty to cover failure to prevent penetration of water.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. EPDM Membrane Materials:
  - 1. Carlisle Roofing Systems, Inc; Sure-Seal EPDM: [www.carlisle-syntec.com](http://www.carlisle-syntec.com).
  - 2. Firestone Building Products, LLC: [www.firestonebpco.com](http://www.firestonebpco.com).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation:
  - 1. Atlas Roofing Corporation: [www.atlasroofing.com](http://www.atlasroofing.com).
  - 2. GAF: [www.gaf.com](http://www.gaf.com).
  - 3. Owens Corning Corp: [www.owenscorning.com](http://www.owenscorning.com).

### 2.02 ROOFING - UNBALLASTED APPLICATIONS

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.
- B. Roofing Assembly Requirements:
  - 1. Solar Reflectance Index (SRI): 78, minimum, calculated in accordance with ASTM E1980, based on 3-year aged data.
    - a. Field applied coating may not be used to achieve specified SRI.
  - 2. Insulation Thermal Value (R), minimum: \_\_\_\_\_ (\_\_\_\_\_); provide insulation of thickness required.
- C. Acceptable Insulation Types - Constant Thickness Application: Any of the types specified.
  - 1. Minimum 2 layers of polyisocyanurate board.
- D. Acceptable Insulation Types - Tapered Application: Any of the types specified.
  - 1. Tapered extruded polystyrene board.

### 2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); externally reinforced with fabric; complying with minimum properties of ASTM D 4637.
  - 1. Thickness: 0.045 inch (1.1 mm).
  - 2. Sheet Width: 76 inch (1930 mm), minimum; factory-fabricate into largest sheets possible.
  - 3. Solar Reflectance: 0.75, minimum, initial, and 0.64, minimum, 3-year, certified by Cool Roof Rating Council.
  - 4. Thermal Emittance: 0.84, minimum, initial, and 0.87, minimum, 3-year, certified by Cool Roof Rating Council.
  - 5. Color: White.
  - 6. Tensile Strength: \_\_\_\_\_ psi (\_\_\_\_\_ MPa), measured in accordance with ASTM D412.
  - 7. Ultimate Elongation: \_\_\_\_\_ percent, measured in accordance with ASTM D412.

8. Hardness: \_\_\_\_, measured in accordance with ASTM D2240, using Type A durometer.
  9. Tear Strength: 150 lbf/in (26.3 kN/m), measured in accordance with ASTM D624.
- B. Seaming Materials: As recommended by membrane manufacturer.
  - C. Colored Finish Coating: Neoprene/hypalon, with aluminum powder concentrate; finish coat of white color.
  - D. Membrane Fasteners: As recommended by and approved by membrane manufacturer.
  - E. Vapor Retarder: Reinforced Kraft paper laminate complying with requirements of fire rating classification; compatible with roofing and insulation materials.
    1. Fire-retardant adhesive.
  - F. Flexible Flashing Material: Same material as membrane.

## **2.04 DECK SHEATHING**

- A. Deck Sheathing: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 1/4 inch (6 mm) thick.

## **2.05 INSULATION**

- A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type I, aluminum foil both faces; Class 1, non-reinforced foam core and with the following characteristics:
  1. Compressive Strength: 16 psi (110 kPa)
  2. Board Size: 48 x 96 inch (1220 x 2440 mm).
  3. Tapered Board: Slope as indicated. Fabricate of fewest layers possible.
  4. Thermal Resistance
  5. Board Edges: Square.
  6. Manufacturers: a. Atlas Roofing Corporation; ACFoam-II and Tapered ACFoam-II: [www.atlasroofing.com](http://www.atlasroofing.com).
    - b. Dow Chemical Co: [www.dow.com](http://www.dow.com).
    - c. GAF: [www.gaf.com](http://www.gaf.com).
  7. Substitutions: See Section 01 6000 - Product Requirements.

- B. Extruded Polystyrene Board Insulation: ASTM C 578, Type X; Extruded expanded polystyrene board with natural skin surfaces, with drainage channels one face; with the following characteristics:
  1. Tapered Board: Slope as indicated; minimum thickness 1/2 in (13 mm); fabricate of fewest layers possible.

## **2.06 ACCESSORIES**

- A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- B. Cant and Edge Strips: Wood fiberboard, compatible with roofing materials; cants formed to 45 degree angle.
- C. Sheathing Adhesive: Non-combustible type, for adhering gypsum sheathing to metal deck.

- D. Sheathing Joint Tape: Paper type , self adhering.
- E. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
  - 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.
- F. Membrane Adhesive: As recommended by membrane manufacturer.
- G. Sealants: As recommended by membrane manufacturer.
- H. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
  - 1. Composition: Asphaltic with mineral granule surface.
  - 2. Surface Color: White or yellow.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

### **3.02 VAPOR RETARDER AND INSULATION - UNDER MEMBRANE**

- A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
  - 1. Extend vapor retarder under cant strips and blocking to deck edge.
  - 2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
- C. Lay subsequent layers of insulation with joints staggered minimum 6 inch (150 mm) from joints of preceding layer.
- D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- E. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- F. Do not apply more insulation than can be covered with membrane in same day.

### **3.03 MEMBRANE APPLICATION**

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Fully Adhered Application: Apply adhesive to substrate per manufacturer's directions. Fully embed membrane in adhesive except in areas directly over or

within 3 inches (75 mm) of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches (75 mm). Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. At intersections with vertical surfaces:

1. Extend membrane over cant strips and up a minimum of 4 inches (100 mm) onto vertical surfaces.

2. Fully adhere flexible flashing over membrane and up to nailing strips.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Coordinate installation of roof drains and sumps and related flashings.

### **3.04 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for general requirements for field quality control and inspection.

B. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

### **3.05 CLEANING**

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

### **3.06 PROTECTION**

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

**SECTION 07 6200**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counter flashings, gutters, downspouts, sheet metal roofing, and other items indicated in Schedule.
- B. Precast concrete splash pads.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 4213 – Metal Wall Panels.
- B. Section 07 9005 - Joint Sealers.

**1.03 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2011.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.
- D. ASTM B32 - Standard Specification for Solder Metal; 2008.
- E. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2011e1.
- F. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2003 (Reapproved 2009).
- G. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.
- H. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012)e1.
- I. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012.

## **1.04 ADMINISTRATIVE REQUIREMENTS**

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

## **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

## **1.06 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

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

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

## **PART 2 PRODUCTS**

### **2.01 SHEET MATERIALS**

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.02 inch (0.6 mm) 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.
    2. Color: As scheduled.
  - B. Lead: ASTM B749, 2.5 lb/sq ft (0.99 mm) thick.
  - C. Stainless Steel: ASTM A666 Type 304, soft temper, 0.015 inch (0.4 mm) thick; smooth No. 4 finish.
- B. Copper: ASTM B370, cold rolled 16 oz/sq ft (0.5 mm) thick; natural finish.**

### **2.02 ACCESSORIES**

- A. Fasteners: Stainless steel, with soft neoprene washers.
- B. Underlayment: ASTM D226, organic roofing felt, Type I ("No. 15").

- C. Slip Sheet: Rosin sized building paper.
- D. Primer: Zinc chromate type.
- E. Protective Backing Paint: Zinc molybdate alkyd.
- F. Sealant: Type \_\_\_\_\_ specified in Section 07 9005.
- G. Plastic Cement: ASTM D4586, Type I.
- H. Solder: ASTM B32; Sn50 (50/50) type.

## **2.03 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.
- F. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

## **2.04 GUTTER AND DOWNSPOUT FABRICATION**

- A. Gutters: SMACNA Architectural Sheet Metal Manual, Square profile.
- B. Downspouts: Round profile.
- C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence  
of 1 in 5 years in accordance with SMACNA Architectural Sheet Metal Manual.  
Accessories: Profiled to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA requirements.
  - 2. Gutter Supports: Brackets.
  - 3. Downspout Supports: Straps.
- E. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.  
Seal metal joints.

## **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).

### **3.03 INSTALLATION**

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
- E. Secure gutters and downspouts in place using concealed fasteners.
- F. Set splash pads under downspouts. Set in place with manufacturer's standard spike method.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

### **3.05 SCHEDULE**

- A. Through-Wall Flashing in Masonry:
- B. Gutters and Downspouts:
- C. Scuppers:
- D. Coping, Cap, Parapet, Sill and Ledge Flashings:
- E. Flashings Associated with simulated thatch roofing, including Valley, Hip, Ridge, Eave and Gutter Edge:**
- F. Counterflashings at Roofing Terminations (over roofing base flashings):
- G. Counterflashings at Curb-Mounted Roof Items, including skylights and roof hatches:

### **END OF SECTION**

## **SECTION 07 9005 JOINT SEALERS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Sealants and joint backing

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 08 8000 - Glazing: Glazing sealants and accessories.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants; 2010.
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2011.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2012.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with other sections referencing this section.

#### **1.05 QUALITY ASSURANCE**

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

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

- A. Provide mock-up of sealant joints in conjunction with window.
- B. Construct mock-up with specified sealant types and with other components noted.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work if approved by Architect and Owner.

#### **1.07 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

## **1.08 WARRANTY**

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

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

#### A. Gunnable and Pourable Sealants:

- 1. BASF Construction Chemicals-Building Systems:  
[www.buildingsystems.bASF.com](http://www.buildingsystems.bASF.com).
- 2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
- 3. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
- 4. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).

#### B. Silicone Sealants:

- 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
- 2. Pecora Corporation; 890NST Ultra Low Modulus Architectural Silicone Sealant  
-  
Class 100: [www.pecora.com](http://www.pecora.com).
- 3. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).

#### C. Polyurethane Sealants:

- 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
- 2. Pecora Corporation; DynaTrol I-XL General Purpose One Part Polyurethane Sealant: [www.pecora.com](http://www.pecora.com).
- 3. Sherwin-Williams Company; Stampede-1-TX Polyurethane Sealant: [www.sherwin-williams.com](http://www.sherwin-williams.com).

#### D. Acrylic Sealants (ASTM C920):

- 1. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).
- 2. Sherwin-Williams Company; Shermax Urethanized Elastomeric Sealant:  
[www.sherwin-williams.com](http://www.sherwin-williams.com).

#### E. Butyl Sealants:

- 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).

2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
3. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).
4. Substitutions: See Section 01 6000 - Product Requirements.

F. Epoxy Sealants:

1. Pecora Corporation; Dynapoxy EP-1200 Two-Part Epoxy Security Sealant:  
[www.pecora.com](http://www.pecora.com).

G. Preformed Compressible Foam Sealers:

1. EMSEAL Joint Systems, Ltd: [www.emseal.com](http://www.emseal.com).
2. Sandell Manufacturing Company, Inc: [www.sandellmfg.com](http://www.sandellmfg.com).
3. Dayton Superior Corporation: [www.daytonsuperior.com](http://www.daytonsuperior.com).
4. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).

## 2.02 SEALANTS

A. Type Exterior - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.

1. Color: Match adjacent finished surfaces.
2. Applications: Use for:
  - a. Control, expansion, and soft joints in masonry.
  - b. Joints between concrete and other materials.
  - c. Joints between metal frames and other materials.
  - d. Other exterior joints for which no other sealant is indicated.
3. Polyurethane Products:
  - a. Pecora Corporation; DynaTrol I-XL General Purpose One Part Polyurethane Sealant: [www.pecora.com](http://www.pecora.com).
  - b. Dymonic: Tremco.
  - c. Sikaflex 1a: Sika Corporation.

B. Type Metal surfaces - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.

1. Product: BA-98 manufactured by Pecora.
2. Product: Tremco butyl sealant
3. Applications: Use for:
  - a. Concealed sealant bead in sheet metal work.
  - b. Concealed sealant bead in siding overlaps.
  - c. Bedding door thresholds.

C. Type Interior - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.

1. Color: To be selected by Architect from manufacturer's standard range.
2. Applications: Use for:
  - a. Interior wall and ceiling control joints.
  - b. Joints between door and window frames and wall surfaces.
  - c. Other interior joints for which no other type of sealant is indicated.

D. Type Non-pick - Nonsag Tamper-Resistant Sealant: ASTM C920, Grade NS, Class 12-1/2, Uses M, G, and A; single or multi- component.

1. Type: Polyurethane.
2. Color: Match adjacent finished surfaces.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Products:
  - a. Pecora Corporation; DynaFlex Flexible Polyurethane Security Sealant: [www.pecora.com](http://www.pecora.com).
  - b. Pecora Corporation; DynaFlex SC Polyurethane STPU Security Sealant: [www.pecora.com](http://www.pecora.com).

E. Type Bath - Bathtub/Tile Sealant: White silicone; ASTM C920, Uses I, M and A; Single component, mildew resistant.

1. Applications: Use for:
  - a. Joints between plumbing fixtures and floor and wall surfaces.
  - b. Joints between kitchen and bath countertops and wall surfaces.
2. Products: a. Pecora Corporation; 898NST Sanitary Silicone Sealant - Class 50: [www.pecora.com](http://www.pecora.com).
3. Substitutions: See Section 01 6000 - Product Requirements.

F. Type Acoustic - Acoustical Sealant for Concealed Locations:

1. Composition: Acrylic latex emulsion sealant.
2. Applications: Use for concealed locations only:
  - a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
3. Products:
  - a. Pecora Corporation; AIS-919 Acoustical and Insulation Latex Sealant:  
[www.pecora.com](http://www.pecora.com).
  - b. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant:  
[www.pecora.com](http://www.pecora.com).
  - c. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant:  
[www.us.hilti.com](http://www.us.hilti.com).

G. Type Floor - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component.

1. Color: Match adjacent finished surfaces.
2. Applications: Use for:
  - a. Expansion joints in floors.
3. Products:
  - a. Pecora Corporation; NR-201 Self-Leveling Traffic and Loop Sealant:  
[www.pecora.com](http://www.pecora.com).
  - b. BASF Construction Chemicals-Building Systems:  
[www.buildingsystems.bASF.com](http://www.buildingsystems.bASF.com).

H. Type Pool - Sealant for Continuous Water Immersion: Polysulfide; ASTM C920, Grade NS, Class 25, Uses I, M, and A; approved by manufacturer for continuous water immersion; single component.

1. Color: To be selected by Architect from manufacturer's standard range.

I. Type Traffic - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, I, M and A; single component.

1. Color: Color as selected.

2. Applications: Use for:

a. Joints in sidewalks and vehicular paving.

3. Products:

a. Pecora Corporation; NR-201 Self-Leveling Traffic and Loop Sealant: [www.pecora.com](http://www.pecora.com).

b. Sherwin-Williams Company; Stampede 1SL Polyurethane Sealant: [www.sherwin-williams.com](http://www.sherwin-williams.com).

c. Substitutions: See Section 01 6000 - Product Requirements.

J. Type Butyl - Butyl Sealant: ASTM C920, Grade NS, Class 12-1/2, Uses NT, M, A, G, O; single component, solvent release, non-skimming, non-sagging.

1. Color: Match adjacent finished surfaces.

2. Products:

a. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).

b. Pecora Corporation: [www.pecora.com](http://www.pecora.com).

c. Substitutions: See Section 01 6000 - Product Requirements.

K. Type Glazing - Silicone Sealant: ASTM C920, Grade NS, Class 25, Uses NT, A, G, M, O; single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding.

1. Color: To be selected by Architect from manufacturer's standard range.

## **2.03 ACCESSORIES**

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

C. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

A. Verify that substrate surfaces 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. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
  - 1. Width/depth ratio of 2:1.
  - 2. Neck dimension no greater than 1/3 of the joint width.
  - 3. Surface bond area on each side not less than 75 percent of joint width.
- F. Install bond breaker where joint backing is not used.
- G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- I. Tool joints concave.

### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

### **3.05 PROTECTION**

- A. Protect sealants until cured.

### **3.06 SCHEDULE**

- A. Exterior Joints for Which No Other Sealant Type is Indicated: Type **ExteriorColor as selected by Architect from manufacturer's standard range..**

### **END OF SECTION**

## **SECTION 08 1113**

### **HOLLOW METAL DOORS AND FRAMES**

#### **PART 1 GENERAL**

##### **1.01 SECTION INCLUDES**

- A. Non-fire-rated steel doors and frames.
- B. Steel frames for wood doors.
- C. Thermally insulated steel doors.
- D. Steel glazing frames.

##### **1.02 RELATED REQUIREMENTS**

- A. Section 08 8000 - Glazing: Glass for doors and borrowed lites.
- B. Section 09 9000 - Painting and Coating: Field painting.

##### **1.03 REFERENCE STANDARDS**

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.
- C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2011).
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
- E. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.
- F. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.

##### **1.04 SUBMITTALS**

- A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
- C. Samples: Submit two samples of metal, 2 x 2 inches (50 x 50 mm) in size showing factory finishes, colors, and surface texture.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

##### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Maintain at the project site a copy of all reference standards dealing with installation.

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

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

A. Steel Doors and Frames:

1. Assa Abloy Ceco, Curries, or Fleming: [www.assaabloydss.com](http://www.assaabloydss.com).
2. Republic Doors: [www.republicdoor.com](http://www.republicdoor.com).
3. Steelcraft, an Ingersoll Rand brand; [www.steelcraft.com](http://www.steelcraft.com).
4. Steelcraft; [www.steelcraft.com](http://www.steelcraft.com).

### **2.02 DOORS AND FRAMES**

A. Requirements for All Doors and Frames:

1. Accessibility: Comply with ANSI/ICC A117.1.
2. Door Top Closures: Flush with top of faces and edges.
3. Door Edge Profile: Beveled on both edges.
4. Door Texture: Smooth faces.
5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
8. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply

with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### **2.03 STEEL DOORS**

A. Exterior Doors

1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless.

2. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
- B. Interior Doors, Non-Fire-Rated:
1. Grade: ANSI A250.8 Level 1, physical performance Level C, Model 1, full flush.
  2. Core: Mineral fiberboard.
  3. Thickness: 1-3/4 inches (44 mm).

## **2.04 STEEL FRAMES**

- A. General:
1. Comply with the requirements of grade specified for corresponding door.
    - a. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 18 gage
  2. Finish: Same as for door.
  3. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches (100 mm) high to fill opening without cutting masonry units.
- B. Exterior Door Frames: Fully welded.
1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
  2. Weatherstripping: Separate, see Section 08 7100.
- C. Interior Door Frames, Non-Fire-Rated: Fully welded type.
- D. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

## **2.05 ACCESSORY MATERIALS**

- A. Louvers: Roll formed steel with overlapping frame; finish same as door components; factory-installed.
1. Style: Standard straight slat blade.
  2. Louver Free Area: \_\_\_\_ percent.
- B. Glazing: As specified in Section 08 8000, factory installed.
- C. Astragals for Double Doors: Specified in Section 08 7100.
1. Exterior Doors: Steel, T-shaped.
- D. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- E. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

## **2.06 FINISH MATERIALS**

- A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

### **3.02 INSTALLATION**

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
- B. Coordinate frame anchor placement with wall construction.
- C. Coordinate installation of hardware.
- D. Coordinate installation of glazing.

### **3.03 TOLERANCES**

- A. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

## **SECTION 08 5113 ALUMINUM WINDOWS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Extruded aluminum windows with fixed sash and operating sash.
- B. Site glazing.
- C. Operating hardware including motorized operators.
- D. Insect screens.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 07 9005 - Joint Sealers: Perimeter sealant and back-up materials.
- B. Section 08 8000 - Glazing.

#### **1.03 REFERENCE STANDARDS**

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - AAMA/WDMA/CSA 101/I.S.2/A440, NAFS — North American Fenestration Standard/Specification for windows, doors, and skylights.; American Architectural Manufacturers Association; 2011.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.
- C. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2012.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2012.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2012.
- F. 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; 2000 (Reapproved 2008)

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

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

#### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, location of powered operators and their mounting hardware, power service to the operators, and installation requirements.

- C. Samples: Submit two samples, 12 x 12 inch (300 x 300 mm) in size illustrating typical corner construction, accessories, and finishes.
- D. Submit two samples of operating hardware.

## **1.06 QUALITY ASSURANCE**

- A. Manufacturer and Installer Qualifications: Company specializing in fabrication of commercial aluminum windows of types required, with not fewer than three years of experience.

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

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation.  
Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

## **1.08 WARRANTY**

- A. Provide 10 year manufacturer warranty against failure of glass seal on insulating glass units, including inner pane dusting or misting. Include provision for replacement of failed units.

# **PART 2 PRODUCTS**

## **2.01 MANUFACTURERS**

- A. Basis of Design: See below under description of products.
- B. Aluminum Windows:
  1. Wausau Window and Wall Systems; Product 2250i INvent series awning project out: [www.wausauwindow.com](http://www.wausauwindow.com).

## **2.02 WINDOWS**

- A. Windows: Tubular aluminum sections, factory fabricated, factory finished, thermally broken, vision glass, related flashings, anchorage and attachment devices.
  1. Frame Depth: 2 1/2".
  2. Air Infiltration: Limit air infiltration through assembly to 0.1 cu ft/min/sq ft (0.5 L/s/sq m) of wall area, measured at a specified differential pressure across assembly in accordance with ASTM E283.
  3. Water Infiltration Test Pressure Differential: 15 pounds per square foot (718 Pa).

4. Thermal Movement: Resists thermal movement caused by 180 degrees F (82.2 degrees C) surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.
5. Overall U-value, Including Glazing: 0.45, maximum.
6. Acoustical Performance: ASTM E90 and E1332; STC 31 and OITC 31 (fixed).

**B. Performance Requirements:**

1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 AW100.
2. Thermal Resistance of Framing: R of 2.5 (RSI of \_\_\_\_).
3. Thermal Resistance of Vision Areas: R of 2 (RSI of \_\_\_\_).
4. Air Infiltration Test Pressure Differential: 6.24 psf.
5. Water Leakage: None, when measured in accordance with ASTM E331 and E 547.
6. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly.
7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system.

**B. Fixed, Non-Operable Type:**

1. Construction: Thermally broken.
2. Glazing: Double; clear; transparent.
3. Exterior Finish: Class I color anodized. Dark Bronze - Wasau color ANO 303
4. Interior Finish: Class I color anodized. Dark Bronze - Wasau color ANO 303

**C. Outswinging Awning Type:**

1. Construction: Thermally broken.
2. Provide screens.
3. Glazing: Double; gray tinted; low-e.
4. Exterior Finish: Class I color anodized. Dark Bronze - Wasau color ANO 303
5. Interior Finish: Class I color anodized. Dark Bronze - Wasau color ANO 303

## **2.03 COMPONENTS**

- A. Frames: 3 3/16 inch (81 mm) wide x 2 1/2 inch (64 mm) deep profile, of 2 inch (51 mm) thick section; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.

- B. Insect Screens: FS L-S-125, woven plastic mesh; 14/18 mesh size.
- C. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.
- D. Glass and Glazing Materials: As specified in Section 08 8000.
- E. Sealant and Backing Materials: As specified in Section 07 9005.
- F. Chain motorized actuators: As represented by Functional Fenestration Inc. 800-677-0228. [www.fenestration.net](http://www.fenestration.net).

1. Manufacturers:

- a. SmartMotion
- b. Vega
- c. Quasar

2. Basis of Design:

- a. Actuator Vega 41148S
- 1) .7 amps @ 24 VDC
- 2) 12 inch stainless steel drive chain
- 3) Gray finish
  - b. Control panels
- 1) 5 or 10 amp output at 24VDC according to number of units controlled
- 2) RQ bridge & control units.
  - c. PSI and 6" modular conductors cable for RQ/RP bus connections.
  - d. PSI programmable switch interface
  - e. Momentary contact switch for operation. BMS system will override switch when mechanical ventilation is in operation.
  - f. Window manufacturer to provide custom plate shim for attachment of actuator

## **2.04 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

## **2.05 HARDWARE**

- A. Projecting Sash Arms: Cadmium plated steel, friction pivot joints with nylon bearings, removable pivot clips for cleaning.
- B. Pulls: Manufacturer's standard type.

## **2.06 FABRICATION**

- A. Fabricate components with smallest possible clearances and shim spacing around perimeter of assembly that will enable window installation and dynamic movement of

- perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
  - C. Prepare components with internal reinforcement for operating hardware.
  - D. Provide steel internal reinforcement in mullions as required to meet loading requirements.

## **2.07 FINISHES**

- A. Class I Natural Finish or Anodized Plus Natural Anodized 2-step Finish:
  - 1. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.
  - B. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils (0.018 mm) thick; light bronze.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive aluminum windows.

### **3.02 INSTALLATION**

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Install sill and sill end angles.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.  
Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.
- G. Install operating hardware not pre-installed by manufacturer.
- H. Install glass and infill panels in accordance with requirements specified.
- I. Install perimeter sealant in accordance with requirements specified.

### **3.03 TOLERANCES**

- A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft (1.5 mm/m) non-cumulative or 1/8 inches per 10 ft (3 mm/3 m), whichever is less.

### **3.04 FIELD QUALITY CONTROL**

- A. Test installed windows for compliance with performance requirements for water penetration, in accordance with ASTM E1105 using uniform pressure and the same pressure difference as specified for laboratory testing.
  - 1. Test one window of each type, as directed by Architect.
  - 2. If any window fails, test additional windows at Contractor's expense.
- B. Replace windows that have failed field testing and retest until performance is satisfactory.

### **3.05 ADJUSTING**

- A. Adjust hardware for smooth operation and secure weathertight closure.

### **3.06 CLEANING**

- A. Remove protective material from factory finished aluminum surfaces.
- B. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- B. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

### **3.07 SCHEDULE**

- A. As indicated in schedule on drawings.

### **END OF SECTION**

## **SECTION 08 8000**

### **GLAZING**

#### **PART 2 PRODUCTS**

##### **1.01 GLAZING TYPES**

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing.
  - 1. Application(s): All exterior glazing unless otherwise indicated.
  - 2. Outboard Lite: Annealed float glass, 1/4 inch (6 mm) thick, minimum.
    - a. Tint: Clear.
  - 3. Inboard Lite: Annealed float glass, 1/4 inch (6 mm) thick, minimum.
    - a. Tint: Clear.
  - 4. Total Thickness: 1 inch (25 mm).

##### **1.02 EXTERIOR GLAZING ASSEMBLIES**

- A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with code.
  - 1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
  - 2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
  - 3. Thicknesses listed are minimum.

##### **1.03 GLASS MATERIALS**

- A. Float Glass Manufacturers:
  - 1. Guardian Industries Corp: [www.sunguardglass.com](http://www.sunguardglass.com).
  - 2. PPG Industries, Inc: [www.ppgideascapes.com](http://www.ppgideascapes.com).
  - 3. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Float Glass: All glazing is to be float glass unless otherwise indicated.
  - 1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
  - 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048.
  - 3. Tinted Types: Color and performance characteristics as indicated.
  - 4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

##### **1.04 SEALED INSULATING GLASS UNITS**

- A. Manufacturers:
  - 1. Cardinal Glass Industries: [www.cardinalcorp.com](http://www.cardinalcorp.com).
  - 2. Viracon, Apogee Enterprises, Inc: [www.viracon.com](http://www.viracon.com).
  - 3. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Sealed Insulating Glass Units: Types as indicated.
  - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  - 2. Edge Spacers: Aluminum, bent and soldered corners.

3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
4. Purge interpane space with dry hermetic air.

## **1.05 GLAZING COMPOUNDS**

### A. Manufacturers:

1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
2. BASF Construction Chemicals-Building Systems:  
[www.buildingsystems.bASF.com](http://www.buildingsystems.bASF.com).
3. Substitutions: Refer to Section 01 6000 - Product Requirements.

B. Butyl Sealant (Type \_\_\_): Single component; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; Shore A hardness of 10 to 20; black color; non-skimming.

C. Acrylic Sealant (Type \_\_\_): Single component, solvent curing, non-bleeding; ASTM C 920, Type S, Grade NS, Class 12-1/2, Uses M and A; cured Shore A hardness of 15 to 25.

## **END OF SECTION**

## **SECTION 09 9000 PAINTING AND COATING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
  1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
  2. Mechanical and Electrical:
    - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
    - b. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
    - c. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
  1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
  2. Items indicated to receive other finishes.
  3. Items indicated to remain unfinished.
  4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  5. Stainless steel, anodized aluminum, bronze, terne, and lead items.
  6. Marble, granite, slate, and other natural stones.
  7. Floors, unless specifically so indicated.
  8. Ceramic and other tiles.
  9. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
  10. Glass.
  11. Concealed pipes, ducts, and conduits.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

#### **1.03 DEFINITIONS**

- A. Conform to ASTM D16 for interpretation of terms used in this section.

#### **1.04 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2012.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- D. GreenSeal GS-11 - Paints; 1993.
- E. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association ; current edition, [www.paintinfo.com](http://www.paintinfo.com).
- F. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Master Painters and Decorators Association ; 2004.

## **1.05 SUBMITTALS**

- A. See - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "drawdown" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
  - 3. Allow 15 for approval process, after receipt of complete samples by Architect.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Product Requirements, for additional provisions.
  - 2. Extra Paint and Coatings: 1 gallon (4 L) of each color; store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.

## **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum ten years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.
- C. Material Safety Data Sheets: At project site maintain file of MSDS sheets for each product used; become familiar with and follow manufacturer's stated application and safety requirements.

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

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

## **1.08 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## **1.09 EXTRA MATERIALS**

- A. Supply 1 gallon of each color, if more than one sheen is used in the project supply one gallon for each color and sheen; store where directed.
- C. Label each container with color and sheen in addition to the manufacturer's label. Note location of use for each container.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
  1. In the event that a single manufacturer cannot provide all specified products, minor exceptions will be permitted provided approval by Owner is obtained using the specified procedures for substitutions.
- C. Paints:
  1. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com).
  2. Pratt & Lambert Paints: [www.prattandlambert.com](http://www.prattandlambert.com).
  3. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- D. Transparent Finishes:
  1. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).

2. Varathane.

E. Stains:

1. Base Manufacturer: Cabot.
2. Olympic.

F. Block Fillers: Same manufacturer as top coats.

G. Substitutions: See Section Product Requirements.

## **2.02 PAINTS AND COATINGS - GENERAL**

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.

1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
3. Supply each coating material in quantity required to complete entire project's work from a single production run.
4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following:
  - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
  - b. Architectural coatings VOC limits of California.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Chemical Content: The following compounds are prohibited:

1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

E. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

F. Colors: As indicated on drawings

1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
3. In finished areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color schedule.

G. Paints and Coatings: Provide products listed in Master Painters Institute Approved Product List, current edition available at [www.paintinfo.com](http://www.paintinfo.com), for specified MPI Categories, except as otherwise indicated for acceptable manufacturers.

1. Provide ready mixed paints and coatings , except field-catalyzed coatings.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

H. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.

I. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.

## **2.03 PAINT SYSTEMS - EXTERIOR**

A. Paint - All Exterior Concrete and Masonry Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry, brick, and cement board.

1. Preparation as specified by manufacturer.
2. Two top coats and one coat primer recommended by manufacturer.
3. Primer On Concrete and Concrete Masonry: One heavy coat latex block filler (100 percent acrylic) squeegeed into pores.

B. Paint - Wood, Transparent, Varnish, No Stain:

1. One coat sealer.

C. Paint - Wood, Transparent, Varnish, Stain:

1. One coat of stain.
2. One coat sealer .

D. Paint - Concrete/Masonry, Opaque, Alkyd, 3 Coat:

1. One coat of block filler.

E. Paint - Galvanized Metals, Alkyd, 3 Coat:

1. One coat galvanize primer.
2. Semi-gloss: Two coats of alkyd enamel.

F. Timber Framing and Dressed Lumber:

1. General stain for pressure treated and peeled wood; handrail branch infill. Use Interior as well: EXT 6.3D Transparent Stain: Wood Stain MPI

- #13. Cabot's or Olympic Transparent stain, solvent based. Colors to be selected by contractor approved by owner, 2 coats.
- 2. Finish coat at columns and trusses: Timber Pro Coatings Clear UV Log & Siding Formula

## **2.04 PAINT SYSTEMS - INTERIOR**

A. Paint - All Interior Surfaces Indicated to be painted as indicated:  
Including marine grade plywood, concrete, concrete masonry, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.

- 1. Two top coats and one coat primer.
- 2. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
- 3. Primer(s): As follows unless other primer is required or recommended by manufacturer of top coats:
  - a. Gypsum Board: MPI #50, Interior Latex Primer Sealer.
  - b. Concrete: MPI #3, Alkali Resistant Water Based Primer.
  - c. Concrete Masonry: MPI #4, Latex Block Filler; heavy coat squeegeed into pores.
  - d. Plaster: MPI #50, Interior Latex Primer Sealer.
  - e. Clay Masonry: MPI #3, Alkali Resistant Water Based Primer.
  - f. Wood: MPI #39, Latex Primer for Interior Wood.
  - g. Wood: MPI #45, Interior Alkyd Primer Sealer.
  - h. Steel, Uncoated: MPI #79, Anti-Corrosive Alkyd Primer for Metal.
  - i. Steel, Uncoated: MPI #107, Rust-Inhibitive Water Based Primer.
  - j. Steel -- Shop Primer: MPI #76, Quick Dry Alkyd Primer for Metal.
  - k. Galvanized Steel: MPI #134, Water Based Galvanized Primer.
  - l. Galvanized Steel: Cementious primer.
  - m. Aluminum: MPI #95, Quick Dry Primer for Aluminum.

- B. Paint - Transparent Finish on Wood, Unless Otherwise Indicated:
- 1. 2 top coats, no stain.
  - 2. Top Coat(s): MPI Clear Water Based Varnish; MPI #128, 129, 130.
  - 3. Satin: MPI gloss level 4; use this sheen at all locations.

C. Paint - Concrete/Masonry, Opaque, Alkyd, 3 Coat:

- 1. One coat of block filler.
- 2. Semi-gloss: Two coats of alkyd ename.

D. Paint - Ferrous Metals, Unprimed, Alkyd, 3 Coat:

- 1. One coat of alkyd primer.
- 2. Semi-gloss: Two coats of alkyd enamel.

E. Paint - Galvanized Metals, Alkyd, 3 Coat:

- 1. One coat galvanize primer.
- 2. Semi-gloss: Two coats of alkyd enamel.

F. Paint - Gypsum Board/Plaster, Latex, 3 Coat:

- 1. One coat of alkyd primer sealer.
- 2. Eggshell: Two coats of latex enamel.

## **2.05 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## PART 3 EXECUTION

### 3.01 SCOPE -- SURFACES TO BE FINISHED

- A. Paint all exposed surfaces except where indicated not to be painted or to remain natural;  
the term "exposed" includes areas visible through permanent and built-in fixtures when they are in place.
- B. Paint the surfaces described in PART 2 PRODUCTS, those indicated on the Drawings, and as follows:
  1. If a surface, material, or item is not specifically mentioned, paint in the same manner as similar surfaces, materials, or items, regardless of whether colors are indicated or not.
  2. Paint surfaces behind movable equipment and furnishings the same as similar exposed surfaces.
  3. Paint surfaces to be concealed behind permanently installed fixtures, equipment, and furnishings, using primer only, prior to installation of the permanent item.
  4. Paint back sides of access panels and removable and hinged covers to match exposed surfaces.
  5. Finish top, bottom, and side edges of exterior doors the same as exposed faces.
  6. Paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment occurring in finished areas to match background surfaces, unless otherwise indicated.
  7. Paint fasteners, boxes and other incidental metal at boardwalk. Color: flat black.
  8. Paint all mechanical and electrical equipment, including that which is factory-finished, exposed to weather or to view on the roof and outdoors.
  9. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
  10. Paint interior surfaces of air ducts and convector and baseboard heating cabinets with flat, nonspecular black paint where visible through registers, grilles, or louvers.
  11. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- C. Do Not Paint or Finish the Following Items:
  1. Items fully factory-finished unless specifically noted; factory-primed items are not considered factory-finished.
  2. Items indicated to receive other finish.
  3. Items indicated to remain naturally finished.

4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
5. Anodized aluminum.
6. Polished and brushed stainless steel items.
7. Concrete masonry in utility, mechanical, and electrical spaces.
8. Acoustical materials.
9. Concealed piping, ductwork, and conduit.

### **3.02 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  1. Gypsum Wallboard: 12 percent.
  2. Plaster and Stucco: 12 percent.
  3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  5. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

### **3.03 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

- J. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
- K. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- L. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- M. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- N. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- O. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Prime concealed surfaces.
- P. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- Q. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.04 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- C. Apply products in accordance with manufacturer's instructions.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**END OF SECTION**

## **SECTION 09 9656** **FLOOR AND WALL SEALANTS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Trowel applied high build flooring and base.
- B. Penetrating concrete floor hardener and sealer
- C. Epoxy wall and floor coating
- D. Integral colored abrasion additive.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 7419 - Construction Waste Management and Disposal: Concrete recycling
- B. Section 01 6116- Volatile Organic Compound Limits: VOC limits on accessory products.
- C. Section 07 9005 - Joint Sealers: Joint between base and wall surface.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM D 2240 - Standard Test Method for Rubber Property - Durometer Hardness
- B. ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser ; 2010.
- C. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials ; 2005.

#### **1.04 SUBMITTALS**

- A. See Administrative Requirements, for submittal procedures.
- B. Floor moisture test report.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available .
- D. Samples: Submit two samples, 2 x 2 in size illustrating color and pattern for each floor material for each color specified.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Product Requirements, for additional provisions
  - 2. Extra Flooring Material: 1 gallons of each color installed.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing work of this section approved by manufacturer.

C. MOCK-UP

1. Provide mock-up 3 feet by 3 feet illustrating coating, color, surface sheen and thickness for each specified coating .

2. Locate where directed by Architect.

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

D. Supervisor Qualifications: Trained by product manufacturer, under direct full time supervision of manufacturer's own foreman.

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

A. Store resin materials in a dry, secure area.

## **1.07 FIELD CONDITIONS**

A. Maintain minimum temperature in storage area of 55 degrees F.

B. Store materials in area of installation for minimum period of 24 hours prior to installation.

C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

D. Safety Requirements

1. Maintain onsite for review by Owner's Representative and construction forces copies of Material Safety Data Sheets (MSDS) for all flooring system components.

2. Comply with all manufacturer's listed safety precautions.

E. Close spaces to traffic during seamless flooring application and for not less than 24 hours after application, unless Manufacturer stipulates a longer period.

F. The substrate must be structurally sound, clean, dry and free of any foreign matter that could inhibit adhesion. Do not install flooring systems over concrete slabs that have not cured and are not sufficiently dry to bond permanently with flooring, as determined by Manufacturer's recommended bond and moisture tests.

## **1.08 PRODUCT APPLICATION & GENERAL LOCATIONS**

A. High quality non-toxic clear sealer for concrete floors: B.D. Classic , BDC 3100AM Antimicrobial.

B. 'Zoo spec' by Protective Polymers Company material in either a tan or gray color to be used on walls to 6 feet above finish floor surface.

C. High quality clear sealer used above 'Zoo spec' finishing system on cmu (6 ft up) to roof deck

D. High quality clear sealer on exterior cmu walls that are exposed

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

A. Applied High Build Coatings:

1. Protective Polymers Company: [www.PROTECTPOLY.com](http://www.PROTECTPOLY.com) , Basis of Design – ZOO SPEC TB
- B. Epoxy Floor and Wall Coating:
  1. B.D. Classic , BDC 3100AM Antimicrobial 100% Solids Epoxy Floor Coating
- C. Penetrating Floor Sealers:

## **2.02 HIGH BUILD FLOOR MATERIALS –**

- A. B.D. Classic , BDC 3100AM Antimicrobial 100% Solids Epoxy Floor Coating : Basis of Design
  1. Topping: 2-part epoxy in accordance with ASTM D5590-00 and Algae Resistance Test 1.3.Alg.1.
  2. BDC 3100AM Antimicrobial
    - a. As a Coating:  
100-300 sf per gallon  
Colors: Clear
  3. Patch Materials
    - a. Shallow Fill and Patching: Dur-A-Flex, Inc. Poly-Crete MD (up to  $\frac{1}{4}$  inch).
    - b. Deep Fill ,Sloping Material & coves (over  $\frac{1}{4}$  inch): Dur-A-Flex, Inc. Poly-Crete WR.

- B. Inspection
  1. Concrete must be clean, dry, and free of grease, paint, oil, dust, curing agents, or any foreign material that will prevent proper adhesion. The concrete should be at least 2500 psi and feel like 30-grit sandpaper. The concrete should be porous and be able to absorb water. A minimum of 28 days cured is required on all concrete. Relative humidity in the concrete floor slab should be below 80% (per ASTM F-2170).
  2. Before starting flooring work, test existing concrete slab to make sure there is no efflorescence or high levels of alkalinity. Alkalinity refers to a high pH reading which means the floor is not neutral. A high alkaline environment can cause salts to creep up through the cement called efflorescence. These salts have a tendency to prevent or destroy the bonding of coatings to the concrete. The most common form of testing is the use of a wide-range pH paper or tape.
  3. Floors must have a pH reading ranges between 5-9 to ensure adhesion. The testing of concrete for alkalinity can show the amount of alkalinity only at the time the test is ran, and cannot be used to predict long-term conditions.

Calcium chloride tests should be conducted to determine if the concrete is sufficiently dry for an epoxy flooring installation. The calcium chloride tests should be conducted in accordance with the latest edition of ASTM F 1869, Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

4. When running a calcium chloride test, it is important to remove any grease, oil, curing agents, etc. so accurate readings can be obtained. A rate of 4.5lbs/1000 ft<sup>2</sup>/24hr period or less is an acceptable amount of vapor pressure for an epoxy flooring installation. If the reading ranges from 4.5lbs to 15lbs, a moisture barrier system such as BDC Vapor Seal can be installed to reduce the emissions. Failing to adhere to these strict guidelines can result in product delamination, discoloration, blistering, or all together failure of the coating system.

#### C. Surface Preparation

Over Concrete Surfaces: Shotblasting or diamond grinding is the preferred method for preparing the concrete. Proper preparation should achieve a clean, porous, and uniform surface that feels like 50 grit sandpaper that will allow the product will soak in and properly bond. Remove debris and wipe with acetone just before new application. Always test a small area to ensure adhesion prior to application.

#### D. Mixing

As a Coating: Premix each component separately. Mix 2 parts A with 1 part B, by volume, into a clean container. Mix thoroughly with a low speed (400-600 rpm) drill motor for 3-4 minutes. Make sure to scrap the sides and bottom of the container during mixing. The product may be thinned with acetone in which case it must be applied thinly enough to allow solvent to escape (minimum 300 sf per gallon). After mixing is completed, remove from container within 5 minutes as epoxy will begin to generate heat. Spread immediately onto the floor, as product is spread out you will have longer working time (10-15 minutes at 70 degrees).

#### E. Application

1. Primer: Prime the surface using BDC 1200 (thinned with 10% acetone), 11 series or 14 series (thinned with water). Read individual product information sheets. The 3100 AM may also be used as a primer when thinned 10% with acetone. Primer coat should be applied thinly and worked into the surface to help seal avoid pin holes.

2. As a Coating: Apply BDC 3100 AM within 24 hours after the primer coat. Immediately after mixing, spread a strip of the batch onto the surface along the edges where it will be “cut in” using a brush. Pour the remaining material near the “cut in” area and spread evenly using a trowel or squeegee and back roll using a 1/4” nap non-shedding roller. A notched trowel or squeegee will help regulate the thickness and a porcupine roller will help to release trapped air and minimize bubbles. Depending on the look, thickness, chemical and abrasion resistance desired, 1 to 2 coats may be applied. A non-skid surface can be achieved by broadcasting and/or back rolling a washed and kiln dried aggregate into the coating.

3. Do not apply at temperatures below 50°F or above 95°F.

After mixing completely (3-4 minutes remove from mixing container and apply to floor) Do not apply over concrete with Moisture Vapor Emissions above 4.5lbs/1000 ft<sup>2</sup>/24hr period. For interior use only unless protected by an UV resistant coating. Concrete must be cured for a minimum of 28 days. Solvents added to thin such as acetone will make product combustible or flammable in which case be aware of sparks or open flame.

If solvent is added, the products must be applied thinly to allow the solvent to escape or proper curing will occur. Clean Up Uncured material can be removed with a solvent. Cured material can only be removed mechanically.

#### F. Warranty

B.D. Classic Enterprises guarantees that this product is free from manufacturing defects and complies with our published specifications. In the event that the buyer proves that the goods received do not conform to these specifications or were defectively manufactured, the buyer's remedies shall be limited to either the return of the goods and repayment of the purchase price or replacement of the defective material at the option of the seller. B.D. Classic makes no other warranty, expressed or implied, and all warranties of merchantability and fitness for a particular purpose are hereby disclaimed. Manufacturer or seller shall not be liable for prospective profits or consequential damages resulting from the use of this product. Manufacturer shall not be liable for material used outside of its shelf life. For product dating, please refer to the batch number on the product or contact B.D. Classic.

## **2.03 ZOO SPEC WALL COATING**

- A. Penetrating concrete floor hardener and sealer: Two coats
  - 1. Primer and Finish Coats (Available products):
    - a. L&M Construction Chemicals, Inc. "Sealhard" voc = 0
    - b. Euclid Chemcial Co: "Diamond Hard" voc = 0
    - c. Sherwin Williams "Sher-Crete Sealer" voc = 0
  - 2. Color: Clear
  - 3. System DFT: None

## **2.04 ACCESSORIES**

- A. Control joint Strips: stainless steel, 1/4 inch thick, height to match flooring thickness, with anchoring features; silver color.
- B. Cant Strips: Molded of flooring resin material.
- C. Cove termination strips: Stainless steel "J" channels to accommodate thickness of wall panels.
- D. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
- B. Verify that wall surfaces are smooth and flat, with mortar joints flush pointed and fully clean. Walls and floors must have cured and dried minimum 28 days after last grouting, pointing or washing.
- C. For wall surface preparation, refer to SSPC-SP13/NACE 6. Surfaces should be clean and dry.
- D. Verify that floor surfaces are dust-free and free of substances that could impair bonding of materials to floor surfaces.
- E. The surface of the concrete floor can be abraded by using ICRI 03732 / SSPC-SP13 / NACE 6 Surface Preparation for Concrete methods. This can include light sand blasting, track blasting or grinding and honing using the appropriate series of abrasives.  
Remove all blast residue. The floor can be ground using either a dry or wet grinding process.
- F. Conditions of new concrete to be coated with cementitious urethane material.
  - 1. Concrete shall be moisture cured for a minimum of 3 days and have fully cured a minimum of 14 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
  - 2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
  - 3. Sealers and curing agents should not to be used.
  - 4. Concrete shall have minimum design strength of 3,500 psi. and a maximum water/cement ratio of 0.45

- 5. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.
- G. Verify that concrete sub-floor surfaces are ready for flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
  - 1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
  - 2. Alkalinity: pH range of 5-9.
- H. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.
- D. Install all joint sealants prior to floor or wall coatings.
- E. Apply primer to surfaces required by flooring and wall coating manufacturer.

### **3.03 INSTALLATION - STRIPS**

- A. Accurately saw cut substrate to install divider strips.
- B. Install strips straight and level to locations indicated.
- C. Install cant strips at base of walls where flooring is to be extended up wall as base.
- D. Install Cove termination strips before cant strips. Screw to wall in longest lengths possible; butt joint and level.

### **3.04 INSTALLATION - FLOORING**

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness required by manufacturer.
- C. The finish buildup floor will have a nominal thickness of 1/4 inch.
- D. Finish to smooth level surface. Slope to established drains.
- E. Evenly broadcast top aggregate onto floor surface in color pattern accepted in mockup.
- F. Cove high build flooring at vertical surfaces in all kitchen and food preparation areas or where noted on Drawings.

### **3.05 PROTECTION**

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Do not allow water to flow on floors for 7 days or until fully cured by manufacturer's curing schedules at site temperatures.

### **3.06 CLEANING AND PROTECTION**

- A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the

curing process.

B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

## SECTION 13 1913

### ANIMAL HOLDING PARTITIONS AND GATES

#### PART ONE - GENERAL

##### 1.01 DESCRIPTION

A. Provide labor, materials, tools and equipment necessary for the following Work items:

1. Interior Mesh Partition Systems.
2. Interior Mesh Ceiling Panel Systems.
3. Hand-woven wire mesh at outdoor holding areas
4. Fabricated door and gate assemblies and control systems.
5. Hydraulically Operated Animal Transfer Door Systems.
6. Manually Operated Animal Transfer Door Systems.
7. Animal Transfer assemblies
8. Skylight Protection Screens

##### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - VOC Content Restrictions

##### 1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2010.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2009.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- E. ASTM A240 / A240M - 11a Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- F. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes; 2010.
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2010.
- H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010a.
- I. ASTM A 242/ A242M - 04(2009) Standard Specification for High-Strength Low-Alloy Structural Steel - 340MPA (50ksi) yield strength weathered steel
- J. ASTM A 588/A588M-10 - Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi [345 MPa] Minimum Yield Point, with Atmospheric Corrosion Resistance. 480MPA (70ksi) yield strength weathered steel
- K. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.
- L. ASTM A847/ A847M - 11 Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric

- Corrosion Resistance
- M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- O. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- P. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- Q. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

#### **1.04 RELATED DOCUMENTS**

- A. USDA Animal and Plant Health Inspection Service, Title 9
- B. American Zoo & Aquarium Association accreditation standards for safety and security.

#### **1.05 DESIGN REQUIREMENTS**

- A. Animal loading: See structural drawings for applicable animal loading.

#### **1.06 QUALITY ASSURANCE**

- A. Provide design of work under the direct supervision of a Professional Engineer licensed in the state of California. Design gates to remain operational under all load scenarios, including maximum animal loads.
- B. Perform all shop and field welding required in connection with the Work of this section, adhering to the current pertinent recommendations of the American Welding Society, with welders who are qualified for making the weld types indicated.
- C. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this section.

#### **1.07 SUBMITTALS**

- A. Comply with pertinent provisions of Section 01 3000 - Administrative Requirements
- B. A complete list of materials proposed to be furnished and installed under this Section.
- C. Manufacturer's specifications and other data needed to demonstrate compliance with specified requirements.
- D. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
- E. All stainless steel items required manufacturer's certification of type of stainless steel used.

F. Shop Drawings of all items proposed to be furnished and installed under this Section. Include plans, sections, elevations, and details as needed. Provide signed stamp of a registered professional engineer per 1.06A above.

G. Structural calculations bearing stamp per 1.06A above

H. Templates for anchor and bolt installation by other trades.

I. Samples:

1. Provide 24 inch square sample of each metal mesh fabric with proper finish as required for the Architect's review.

## **1.08 PRODUCT HANDLING**

A. General:

1. Comply with pertinent provisions - Product Requirements.
  - a. Protection:
    - 1) Use all means necessary to protect the materials of this section before, during, and after installation and to protect the Work and materials of all other trades.
  - b. Replacements:
    - 1) In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

## **PART TWO - PRODUCTS**

### **2.01 MATERIALS AND COMPONENTS**

A. Metal Surfaces, General:

1. For the Work of this Section use only those materials which are smooth and free from surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness.

2. Metal Finishes, Galvanized:

- a. Unless specified otherwise, provide a zinc coating for all ferrous materials included in the Work of this Section, as follows:
  - 1) ASTM A153 for galvanizing iron and steel hardware.
  - 2) ASTM A123/123M for galvanizing rolled, pressed, and forged steel shapes, plates, bars, and strip 3 mm (1/8") thick and heavier and for zinc coating (hot dipped) on assembled steel products .
- b. All galvanized work to be reformed true to line and level as required in shop before delivery to the job site.

B. Standards:

1. Steel plates, shapes, and bars: ASTM A36.
2. Steel plates to be bent or cold formed: ASTM A283, Grade C.
3. Steel tubing, cold-formed, welded, or seamless: ASTM A500.
4. Steel bars and bar-size shapes: ASTM A306, Grade 65, or ASTM A36.
5. Cold-finished steel bars: ASTM A108, grade as selected by the fabricator.
6. Cold-rolled carbon steel sheets: ASTM A336.
7. Galvanized carbon steel sheets: ASTM A526, with G90 zinc coating in accordance with ASTM A525.

8. Stainless steel: Type 302 or 304 of American Iron and Steel Institute, No. 4 finish.
9. Stainless steel sheets: Type 302 or 304, 24 gauge of American Iron and Steel Institute, No. 4 finish.
10. Grey iron castings: ASTM A48, Class 30.
11. Malleable iron castings: ASTM A47, Grade as selected by the fabricator.
12. Steel pipe: ASTM A53, type as selected, Grade B, black finish unless galvanizing is required, Schedule 40 unless otherwise indicated.
13. Concrete inserts: Threaded or wedge type, galvanized ferrous castings, either malleable iron ASTM A47 or cast steel ASTM A27.
14. Provide bolts, washers, and shims as required, hot-dip galvanized, ASTM A153.
15. Bushings and Thrust Washers: Oil impregnated, porous bronze, Oilite Bronze or equal.
16. CLFMI CLF 2445 - Product Manual; Chain Link Fence Manufacturers Institute; 1997.
17. Weathering steel at various components where indicated.

## **2.02 FASTENERS**

- A. Provide zinc-coated or stainless steel fasteners unless specified otherwise.
- B. Select fasteners for the type, grade, and class required.
  1. All fasteners listed below shall comply with ASTM A307 and as follows:
    - a. Bolts and nuts: Regular hexagon-head type, Grade 5. Galvanized or SST
    - b. Expansion anchors in concrete:
    - c. Drilled, epoxied anchors in concrete:
    - d. Lag bolts: Square-head type, meeting Fed Spec FF-B-561.
    - e. Machine screws: Stainless steel or galvanized.
    - f. Wood screws: Flat-headed carbon steel.
    - g. Plain washers: Round, galvanized or SST, complying with Fed Spec FF-W-92.
    - h. Masonry anchorage devices: Expansion shields complying with Fed Spec FF-S-325.
    - i. Toggle bolts: Tumble-wing, type, class and style as required, but complying with Fed Spec FF-B-588.
    - j. Lock washers: Helical spring type carbon steel, complying with Fed Spec FF-W-84.
    - k. Stainless Steel Fasteners: Type 304 or 316/L.
    - l. Stainless Steel Compression Bands with treaded screw tightening.
  2. At all fasteners provide primerless thread locking compound (Loctite blue 243 medium strength or equal)

## **2.03 INTERIOR MESH PARTITION & ANIMAL TRANSFER SYSTEMS**

A. General: Systems are as shown on the drawings and as described herein for reference. Provide all bolts, brackets, hardware and accessories needed for a complete installation.

B. Definition of Systems:

1. Animal Transfer Doors: TYPE Manual
  - a. System Type(s): Horizontal Sliding
  - b. Door Sizes: as indicated in the Drawings.
  - c. Operation: Manual (with cable or bar system) or handle
  - d. Track and frame material: Carbon Steel with a galvanized finish.
  - e. Track Lining: UHMW polyethylene
  - f. Door Panel Material and Thickness: Polyethylene sheet, 1 inch thick, in sandwich. Welded wire mesh 2x2x1/4 welded to steel frame where indicated.
  - g. Door Frame Material: Steel tube, welded corners. Thickness per Drawing.
  - h. Fabricate components subject to wear with Owner accessible and serviceable parts.
2. Animal Transfer Doors: TYPE Hydraulic
  - a. System Type(s): Prefabricated Horizontal Sliding
  - b. Door Sizes: as indicated in the Drawings.
  - c. Operation: Hydraulic. The doorframe houses one terminal strip, two 12-volt control solenoids, and one self-contained 12-volt pump, reservoir and hydraulic safety circuit package. The cylinder is located inside of the actuated portion of the door. Battery charge is adequate for 50 door openings.
  - d. Track and frame material:
  - e. Track Lining: UHMW polyethylene
  - f. Door Frame Material: Hot dip galvanized, welded corners, 3/8 inch thickness.
  - g. Control Accessories: Remote keyed pushbutton operator, wall mounted with a 120VAC to 12VDC trickle charger, and key switch. Wet location rated or protective housing.
  - h. Fabricate components subject to wear with Owner accessible and serviceable parts.
3. Animal Transfer Doors
  - a. System Type(s): Horizontal.
  - b. Door Sizes: as indicated in the Drawings.
  - c. Operation: Manual (with cable or bar system)
  - d. Track and frame material: Carbon Steel with a galvanized finish.
  - e. Door Panel Material and Thickness: Polypropylene sheet, 1/2 inch thickness minimum.
  - f. Fabricate components subject to wear with Owner accessible and serviceable parts.
4. Transfer Chutes and Corridors:
  - a. Custom fabricated according to the Drawings.

- b. Frame and infill mesh materials to match Mesh Partition materials unless noted otherwise.
- 5. Keeper and service Doors and Gates Hardware:
  - a. Custom steel frame and mesh as described in this Section and on the drawings.
  - b. Hinges: Stanley or Hager Heavy Duty. Three per door unless otherwise noted. Galvanized.
  - c. Latches at exterior gates: As detailed. Provide lockable hardware. All gates to have two point locks, some accessible from both sides as indicated.
  - d. Locking Mechanisms: Double throw-bolts designed to accept keyed deadbolts.
  - e. Section 323113 - Chain link Fences and Gates, for chain link gates as shown on the Drawings
  - f. Use wire mesh and frames as specified above for Gorilla doors and gates as shown on the Drawings.
  - g. Surface Slide Bolt with Padlock: Stanley # 763808, 6 1/2 inch zinc plated. Thru bolt with 1/4 inch diameter carriage bolts and cap screws. Owner to provide padlock.
- 6. Skylight Protection Screens at Holding Skylights
  - a. Attach per Drawings with galvanized fasteners.

### C. MANUFACTURERS

1. LGL Animal Care Products Inc.  
 721 Peach Creek Cut-Off Rd.  
 College Station, TX 77845  
 (979) 690-3434

2. Fauna Research Inc.  
 8 Bard Ave.  
 Redhook, NY 12571  
 (845) 758-2549

3. Or Approved Equal

## 2.04 CONTROLS

### A. SLIDING DOOR TRUCKS

1. Remote Controlled Polypropylene & Mesh Sliding Doors:
  - a. Richards-Wilcox hanger (truck), size as shown, or approved equal.

### B. SLIDING DOOR TRACKS AND BRACKETS

1. Remote Controlled FRP & Mesh Sliding Doors:
  - a. Richards-Wilcox track, size as shown, or approved equal.

C. WIRE ROPE: 6X41 GALVANIZED IMPROVED PLOW STEEL, Match 1/8" used at Hoofstock, Lion and Cheetah, 3/16" at Rhino and Giraffe.

D. PULLEYS ( BLOCKS ) :

1. Standard flat pulleys, zinc plated steel with plated steel sheaves and oil impregnated bronze bushings, grooved for wire rope,
2. Manufacturer: Richard-Wilcox (Basis of Design), Block Division Inc or approved equal.
  - a. Vertical Mount pulley : Galvanized 0234.00017
  - b. Flush Mount pulley: Galvanized 0234.00018

E. HYDRAULIC CONTROLS

1. Self-Contained Hydraulically Operated Doors:
  - a. Provide one pull handle for each door control.
  - b. Protect all components within animal areas by enclosing with durable and removable housings capable of withstanding the full force of direct animal contact.
  - c. Provide secure locking of door mechanism in both opened and closed positions.
  - d. Provide integrated control system with manual override and emergency electrical power compatibility.
  - e. Provide durable switching controls on walls in keeper corridors adjacent to animal dens
2. Door Tracks and Guides:
  - a. Integrate metal guides and tracks for Animal Doors into the framework of the Mesh Partition System.
  - b. Fabricate components subject to wear with Owner accessible and serviceable parts.
  - c. Fabricate Animal Transfer Doors for integration into Mesh Partition System as well as for Surface mounting on concrete walls.

## PART THREE - EXECUTION

### 3.01 INSPECTION

A. Examine the areas and conditions under which metal fabrications are to be installed, and correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

A. Furnish final design and setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete construction. Coordinate delivery of such items to project site.

### 3.03 FABRICATION

A. Provide fabrication drawings for all work fabricated under the provisions of this section including assemblies of manufactured items and modifications to manufactured items.

- B. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability of adjacent or connecting material in the finished product.
- C. Work to dimensions shown or as accepted on the Shop Drawings, using industry-proven methods of fabrication and support.
- D. Use type of materials shown or specified for the various components of the Work.
- E. Form exposed Work true to line and level, with accurate angles and surfaces and with straight sharp edges.
- F. Ease the exposed edges to a radius of approximately 0.8 mm (1/32") unless otherwise shown.
- G. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- H. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush; match and blend with adjoining surfaces.
- I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown, or, if not shown, use Phillips flat-head (countersunk) screws or bolts or flat head socket cap..
- J. Provide for anchorage of the type shown. Coordinate with supporting structure. Fabricate and space the anchoring devices to provide adequate support for intended use.
- K. Cut, reinforce, drill, and tap miscellaneous metal Work as indicated to receive finish hardware and similar items.
- L. At any exposed surfaces, do not leave any sharp or pointed fabrication burrs, cuts, scraps, temporary erection bars, weld splatter or other materials which might cause injury to animals or keepers.

### **3.04 GALVANIZING**

- A. Provide a zinc coating for those items shown or specified to be galvanized, as follows:
  - 1. ASTM A153 for Hot-Dip galvanizing iron and steel hardware.
  - 2. ASTM A123 for Hot-Dip galvanizing rolled, pressed, and forged steel shapes, plates, bars, and strip 3 mm (1/8") thick and heavier. Also fabricated or assembled products.
- B. All galvanized work to be reformed true to line and level, as required, in the shop before delivery to the job site.
- C. Plug all exposed drainage holes from galvanizing process and grind smooth. Touch up with rolled application of cold galvanizing compound.

### **3.05 SHOP FINISHING**

- A. At exterior framing.

- B. Shop paint metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, stainless steel, and galvanized surfaces, unless otherwise specified.
- C. Remove scale, rust, and other deleterious materials before applying shop coat.
- D. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 or SSPC-SP-3.
- E. Remove oil, grease, and similar contaminants in accordance with SSPC-SP-I.
- F. At ferrous metals, sand blast to near white metal in accordance with SSPC-SP-10 before applying zinc rich polyamid epoxy primer.
- G. Ferrous metals to receive zinc rich polyamide epoxy primer require inspection by Architect or Inspection and Testing Agency prior to priming. Notify Architect 24 hours prior to prime coating.
- H. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's recommendations, and at a rate to provide the recommended dry film thickness.
- I. Use painting methods which will result in full coverage of joints, corners, edges, and exposed surfaces.

### **3.06 INSTALLATION**

- A. Provide anchorage devices and fasteners where necessary for securing partitions, door assemblies and other components to in-place construction including threaded fasteners for concrete inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting and Placement
  1. Perform cutting, drilling, and fitting required for installation of metal fabrications.
  2. Set Work accurately in location, alignment, and elevation, and make plumb, level, true, and free from rack, measured from established lines and levels.
  3. Provide temporary bracing or anchors in formwork for items which are to be built into concrete or similar construction.
  4. Fit exposed connections accurately together for form tight hairline joints.
  5. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.
  6. Grind exposed joints smooth, and touch up shop paint coat. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

**END OF SECTION**