SECTION 050513.13 - SHOP-APPLIED GALVANIC COATINGS FOR METAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes hot-dip galvanizing after manufacture or fabrication of iron and steel materials specified in other sections.

1.2 RELATED WORK

A. Fabrication and installation of iron and steel materials are specified in other Sections.

1.3 QUALITY ASSURANCE

A. Coating Applicator: Company specializing in hot-dip galvanizing after fabrication and following the procedures of the Quality Assurance Manual of the American Galvanizers Association.

B. Advise galvanizer of architecturally exposed material and other special appearance considerations prior to acceptance of quote or start of fabrication.

1.4 SUBMITTALS

A. Submit a certificate of compliance stating that hot dip galvanized coatings meets or exceeds the specified requirements of ASTM A 123, ASTM A 767 or ASTM A 153 as applicable and complies with other requirement's specified herein.
   1. The certificate shall be signed by the galvanizer containing a detailed description of the material processed, and shall include the ASTM standard used for coatings.

1.5 DELIVERY, STORAGE AND HANDLING

A. Load and store galvanized articles in accordance with accepted industry standards to prevent the formation of wet storage stain.
   1. Load material in such a manner that continuous drainage may occur.
   2. Store articles raised off the ground and, if necessary, separated with strip spacers to provide free access of air to most parts of the surface. Incline units in a manner which will permit continuous drainage.
   3. Do not support galvanized steel on cinders or clinkers.
   4. Do not support galvanized steel on wet soil or decaying vegetation.

B. To minimize premature oxidation, store material over 63 feet in length indoors at galvanizing facility or other location approved by Architect until material is packaged and ready for shipment to job site.

C. To minimize handling damage, assign the galvanizer responsibility for transporting materials from the steel fabricators plant to the galvanizer and back to the steel fabricators plant. Utilize the galvanizer's trucks unless otherwise acceptable to the

Architect based on prior written agreements between the steel fabricator and the galvanizer.

D. Handle articles to be galvanized in such a manner as to avoid any mechanical damage and to minimize distortion.

PART 2 - PRODUCTS

2.1 APPLICATORS

A. Acceptable Coating Applicators:
   1. Voight & Schweitzer Galvanizers, Inc., 313-535-2600.
   2. Members of the American Galvanizers Association.

2.2 MATERIALS

A. Steel material for galvanizing shall be structural shapes, pipe, sheet, fabrications and assemblies geometrically suitable for galvanizing as described in ASTM A 384 and ASTM A 385.

B. Steel material shall be chemically suitable for galvanizing.

C. Zinc for Galvanizing: Conform to ASTM B 6.
   1. The composition of metal in the galvanizing bath shall not be less than 98% zinc.

D. Galvanizing Repair Paint: Inorganic zinc-rich primer; one of the following:
   1. MPI#19.
   2. SSPC-Paint 20, Type 1.
   3. ASTM A 780.
   4. SSPC-Paint 30.

2.3 FABRICATION REQUIREMENTS

A. Fabricate structural steel in accordance with Class I, II, III guidelines as described in AGA's "Recommended Details for Galvanized Structures."

B. Fabricate products in accordance with the applicable portions of ASTM A 143, ASTM A 384, and ASTM A 385, except as specified herein. Avoid fabrication techniques that could cause distortion or embrittlement of the steel.

C. Notify the Architect/Engineer and hot-dip galvanizer regarding potential problems or potential handling problems during the galvanizing process that may require modification of design before fabrication proceeds.

D. Remove all welding slag, splatter, anti-splatter compounds and burrs prior to delivery for galvanizing.
   1. Avoid the use of high silicon welding rods for welds that are to be galvanized.

E. Provide holes and/or lifting lugs to facilitate handling during galvanizing.

F. Avoid unsuitable marking paints. Use only water-soluble markers. Consult with the galvanizer about removal of grease, oil paint and other deleterious material prior to fabrication.

G. Remove, by blast cleaning or other methods, surface contaminants and coatings that would not be removable by the normal chemical cleaning process in the galvanizing operation.

H. Whenever possible, fabricate items with slip joints to minimize field welding of material.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Pre-clean steel work in accordance with accepted methods to produce an acceptable surface for quality hot-dip galvanizing.
1. Prepare steel utilizing a caustic bath, acid pickle, and flux. Where appropriate, steel may be blast cleaned and fluxed.

3.2 COATING APPLICATION

A. Galvanize steel members, fabrications and assemblies after fabrication by the hot-dip process in accordance with ASTM A 123.

B. Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with ASTM A 153 in a kettle capable of reaching 1000 degrees Fahrenheit.

C. Galvanize reinforcing steel in accordance with ASTM A 767.

D. Safeguard products against steel embrittlement in conformance with ASTM A 143.

E. Use of the "wet method" process of galvanizing, involving a flux blanket on the kettle is prohibited.

F. Coat in a single dip steel items less than 60 feet long by 4 feet wide by 9 feet deep, in order to minimize potential distortion. Double dip larger items.

G. Where galvanized articles are indicated to be painted, do not quench in water containing a passivating chemical.

H. Air-cool products which may be prone to distortion to avoid the effects of thermal shock.

I. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

3.3 COATING REQUIREMENTS

A. Coating Weight: conform with paragraph 5.1 of ASTM A 123, Table 1 of ASTM A 767, or Table 1 of ASTM A 153, as appropriate.

B. Surface Finish: Continuous, adherent, as smooth and evenly distributed as possible and free from any defect detrimental to the stated end use of the coated article.

C. Adhesion: Withstand normal handling consistent with the nature and thickness of the coating and normal use of the article.

3.4 WELDING

A. Perform welding of galvanized steel in accordance with the American Welding Society publication D19.0-72, Welding Zinc Coated Steel.

3.5 INSPECTIONS AND TESTS

A. Inspect and test hot-dip galvanized coatings at the galvanizers plant under the guidelines in the AGA publication "Inspection of Products Hot-Dip Galvanized After Fabrication." Inspections and tests shall include the following:
   1. Visual examination and tests in accordance with ASTM-A 123, A 767 or A 153 as applicable to determine the thickness of the zinc coating on the metal surface. Conduct tests by the following method.
      a. Magnetic thickness measurement in accordance with ASTM E 376.

B. Where slip factors are required to enable friction grip bolting, obtain these after galvanizing by suitable treatment of the faying surfaces in accordance with the latest edition of the Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts as approved by the Research Council on Structural Connections of the Engineering Foundation.

C. Furnish Notarized Certificate of Compliance with ASTM Standards and Specifications herein listed. The Certificate must be signed by the galvanizer and contain a detailed description of the material processed. The Certificate shall include reference to the ASTM standard used for the coating.

3.6 REPAIR OF DAMAGED COATING

A. The maximum area to be repaired is defined in accordance with ASTM A 123 Section 6.2 current edition.
   1. The maximum area allowed to be repaired in the field shall be determined in advance and prior to the start of fabrication by mutual agreement between the galvanizer, steel fabricator, Architect, and Owner.

B. Surfaces to be repaired shall be clean, dry, and free of oil, grease and corrosion products.

C. Repair uncoated areas and areas damaged by welding, flame cutting or during handling, transport or erection by one of the following methods in accordance with ASTM A 780 whenever damage exceeds 3/16 inch in dimension. Minimum thickness requirements for the repair are described in ASTM A 123 section 6.2.3 current edition and in ASTM A 780.
   1. Repair Using Zinc-Based Alloys: Comply with requirements in Annex A1 in ASTM A 780.

2. Repair Using Paints Containing Zinc Dust: Comply with requirements in Annex A2 in ASTM A 780.
   a. The use of aerosol (spray) cans is prohibited. Use brush applied paint products for touch up of galvanized surfaces.
3. Repair Using Sprayed Zinc (Metallizing): Comply with requirements in Annex A3 in ASTM A 780.

D. Wet Storage Stain: Remove wet storage stain as follows prior to installation to prevent premature failure of the coating:
   1. Arrange objects to allow rapid surface drying.
   2. Remove light deposits with a stiff bristle (not wire) brush. Remove heavier deposits by brushing with an acidic based metal cleaner. Thoroughly rinse cleaned surfaces with water.
   3. Check coating thickness in affected areas to ensure that the zinc coating remaining after the removal of wet storage stain is sufficient to meet or exceed specified requirements.

END OF SECTION 050513.13

SECTION 050513.21 - SHOP-APPLIED PRIMERS FOR METAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Shop-applied primers and paint coatings.

B. Related Sections include the following:
   1. Division 2-49 Sections specifying products fabricated from steel.
   2. Division 9 Section "Painting" for surface preparation and priming requirements.

1.2 SUBMITTALS

A. Product Data: For each type of primer and paint product.

B. Qualification Data: For shop-painting applicators.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.3 COORDINATION

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

PART 2 - PRODUCTS

2.1 PRIMER

A. Shop Primers:
   1. Where steel is scheduled to receive field-applied finish coatings, provide primers that comply with Division 9 painting and coating Sections.
   2. Where steel is concealed in finished construction with no further finish or coatings, provide fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#76.
      a. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
      b. Color: Gray

B. Inorganic, zinc-rich, primer complying with MPI#19 and as indicated by manufacturer's designations in the Paint Product Schedule, capable of providing sound foundation for field applied top coats despite prolonged exposure, cathodic protection and corrosion resistance.
   1. Pigment Content: Minimum 80% zinc in dry film by weight.
   2. Compatible with finish paint system specified in Division 9 painting and coating Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements.

B. Verify suitability of substrates, including surface conditions.
   1. Review other Sections specifying prime coats and factory finishes to ensure compatibility of paint coating system for the various substrates.

C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
   1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Surface Preparation: Clean surfaces to be primed. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
   1. Where steel is scheduled to receive field-applied finish coatings, comply with surface preparation requirements in Division 9 painting and coating Sections where a greater degree of surface preparation is specified for steel to receive field-applied finish coatings.
   2. Where steel is concealed in finished construction with no further finish or coatings, prepare surfaces per SSPC-SP 3, "Power Tool Cleaning."
   3. Where steel is to receive inorganic, zinc-rich, primer, prepare surfaces per SSPC-SP 10, "Near White Blast." Coordinate the required blast profile with the approved paint submittal prior to beginning surface preparation.

3.3 APPLICATION

A. Shop prime steel surfaces except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   2. Surfaces to be field welded.
   3. Surfaces to be high-strength bolted with slip-critical connections.
   4. Galvanized surfaces.

B. Priming: Immediately after surface preparation, apply primer according to primer manufacturer's written instructions.
   1. Where steel is scheduled to receive field-applied finish coatings, apply primer at rate to comply with Division 9 painting and coating Sections.
   2. Where steel is concealed in finished construction with no further finish or coatings, apply primer at rate recommended by primer manufacturer to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

3. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
4. Apply inorganic, zinc-rich primer by airless or conventional spray to minimum 3.0 mil DFT. Brushes or rollers may be used for small detail or touch-up work.
5. Stripe paint corners, crevices, bolts, welds, and sharp edges.
6. Apply two coats of shop primer to surfaces inaccessible after assembly or erection to provide a dry film thickness of not less than 3.0 mils. Change color of second coat slightly to distinguish it from first.

3.4 REPAIRS AND PROTECTION

A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted steel.
   1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
   2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION 050513

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Miscellaneous steel framing and supports.
2. Miscellaneous steel trim.
3. Metal bollards with covers.
4. Loose bearing and leveling plates.

B. Products furnished, but not installed, under this Section:
1. Loose steel lintels.
2. Anchor bolts indicated to be cast into concrete or built into unit masonry.

1.2 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.3 SUBMITTALS

A. Product Data: For the following:
1. Grout.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.
1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

2.3 BOLLARD COVERS

A. Bollard Cover: Polyethylene slip-on covers to suit bollard diameter.

1. Manufacturers and Products: Subject to compliance with requirements, provide one of the following:
   a. BB-2255 by American Floor Products.
   b. BPD-YL Series by Barco Products.
   c. Bollardgard by Thermoprene, Inc.
   d. Eagle Bumper Post Sleeve by Eagle Manufacturing.
   e. Post Guard by Encore.
   f. Sureguard Polyethylene Bollard Shields by Sureguard Security Products
2. Color: Safety Yellow.

2.4 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls.

B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
   2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.5 MISCELLANEOUS MATERIALS

A. Shop Primers: As specified in Division 05 Section "Shop-Applied Primers for Metal."

B. Galvanizing Repair Paint: As specified in Division 05 Section "Shop-Applied Galvanic Coatings for Metal."

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

D. Concrete: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.6 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

C. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.

D. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.8 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

2.9 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

2.10 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.11 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

2.12 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.13 STEEL AND IRON FINISHES

A. Galvanized Finish: As specified in Division 05 Section "Shop-Applied Galvanic Coatings for Metal."

B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, or masonry, or unless otherwise indicated.

1. Shop prime with primer specified in Division 05 Section "Shop-Applied Primer for Metal."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING METAL BOLLARDS

A. Anchor bollards in place with concrete footings. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

C. Install bollard covers in accordance with manufacturer's printed instructions.

3.3 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

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

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000