FACTORY-APPLIED COATING FOR METAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section specifies factory-applied metal coatings including the following:
   1. The Basis of design is **Colorgalv® Thermoset Plus-** Hot-dip galvanizing for iron and steel fabrications with a factory-applied High Performance Polyamide Epoxy Powder Primer and Super Durable TGIC-Free Polyester Powder Urethane with a Super Durable Polyester Powder Urethane Clear Coat for improved gloss and color retention as well as Anti-Graffiti protection.

1.2 RELATED SECTION

A. Examine Contract Documents for requirements that affect Work of this Section. Other Specification Sections that directly relate to Work of this Section include, but are not limited to:
   1. Section 033000 - Cast-In-Place Concrete.
   2. Section 042000 - Unit Masonry.
   3. Section 051200 - Structural Steel Framing.
   4. Section 053000 - Metal Decking.
   5. Section 055000 - Metal Fabrications.
   6. Section 055100 - Metal Stairs.
   7. Section 055200 - Metal Railings.
   8. Section 057000 - Decorative Metal.
   9. Section 077100 - Roof Specialties.
   10. Section 107000 - Exterior Specialties.
   11. Section 107500 - Flagpoles.
   12. Section 129300 - Site Furnishings.
   13. Section 323000 - Site Improvements.
   14. Section 323100 - Fences and Gates.

1.3 SUBMITTALS

A. Product Literature for Factory-Applied Metal Coatings: Submit galvanizer’s coatings data sheets for coatings specified in this Section including physical performance test data.

B. Verification Samples for Factory-Applied Metal Coatings: Submit two 3 inch by 6 inch samples of factory-applied coatings and colors proposed for use for approval prior to coating application.

C. Certificate of Compliance for Items Coated by Galvanizer: If requested, submit notarized Certificate of Compliance with invoice for galvanizing, signed by the galvanizer, indicating compliance with requirements of specifications. Include scope of services provided, and quantity and itemized description of items processed.

D. Certificate for review of Shop Drawing Review by Galvanizer: If requested, submit galvanizer's certification that shop drawings for metal fabrications to receive metal coatings have been reviewed and that fabrications are acceptable to galvanizer for proper application of galvanizing and metal coatings. All drawings shall be signed by the galvanizer to indicate acceptance of design for galvanizing.

E. Certificate of Compliance of Item Identification by Galvanizer: If required, the galvanizer shall mark all lots of material with a clearly visible tag indicating the name of the

galvanizer, the type of the coatings, and the applicable ASTM standards. If requested, submit certification of compliance that items have been tagged.

F. Certificate of Compliance for Shop Application: If requested, Galvanizer/applicator shall supply a certificate of compliance with SSPC-QP3 – Certification Standard for Shop Application of Complex Protective Coating Systems.

G. Substitutions: If substitutions or other products are proposed, submit this specification signed by the firm proposing the other products, indicating line-by-line comparison of the proposed substitution or equal product with test results. Substitutions proposed without comparison test results will not be accepted.

H. Galvanizer shall have a written Quality Control/Quality Assurance manual for hot dip galvanizing and factory applied coatings.

I. Submit Certification from the American Galvanizers Association that Galvanizer has completed all course requirements and has a certified Master Galvanizer on staff.

1.4 QUALITY ASSURANCE

A. Galvanizer's Qualifications: Engage the services of a qualified galvanizer who has demonstrated a minimum of ten years of experience in the successful application of galvanized coatings specified in this specification in the facility where the work is to be performed and who will apply the coatings within the same facility. For surface preparation and shop painting, current SSPC QP-3 certification is required.

B. Coating Applicator's Qualifications: Galvanizing and factory-applied coatings shall be performed by a company with a minimum of ten years of experience in the successful application of hot-dip galvanizing utilizing the dry kettle process.

C. Pre-Construction Conference for Metal Fabrications to Receive Factory-Applied Metal Coatings: Contractor shall schedule a meeting to be attended by Contractor, Architect, fabricator, and galvanizer. Agenda shall include the following: Project schedule, scope of services, coordination between fabricator and galvanizer, finish of surfaces, application of coatings, color selections, submittals, and approvals.

D. Coordination between Fabricator and Galvanizer: Prior to fabrication and final submittal of shop drawings to the Architect, direct fabricators to submit shop drawings to the galvanizer for all metal fabrications to receive factory-applied metal coatings. Direct galvanizer to review fabricator's shop drawings for suitability of materials for galvanizing and coatings and coordinate any required modifications to fabrications required to be performed by the fabricator.

E. Environmental Compliance: Coatings shall be certified OTC/VOC compliant and conform to EPA standards and local regulations.

F. Coating Applicator: For the purpose of establishing a standard of quality and performance, provide factory-applied metal coatings by Duncan Galvanizing, 69 Norman Street, Everett, MA, 02149, telephone 617-389-8440, fax 617-389-2831, www.duncangalvanizing.com.

PART 2 - PRODUCTS

2.1 SECTION INCLUDES

A. This Section specifies factory-applied metal coatings including the following:

1. The Basis of design is **Colorgalv® Thermoset Plus-** Hot-dip galvanizing for iron and steel fabrications with a factory-applied High Performance Polyamide Epoxy Thermosetting Primer and Super Durable Thermosetting Urethane with a Urethane Clear Coat for improved gloss and color retention as well as Anti-Graffiti protection.

B. Hot-Dip Galvanizing: For steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dip process. Galvanizing bath shall contain special high grade zinc and other earthly materials.
   1. Basis of design is **Duncan Duragalv®**
   2. Comply with ASTM A 123 for fabricated products and ASTM A 153 for hardware.
   3. Provide thickness of galvanizing specified in referenced standards.\
   4. Fill vent holes after galvanizing if required, and grind smooth.
   5. All exposed galvanizing shall be blasted per SSPC SP16 to achieve a 1-3 mile profile. Inaccessable areas shall be abraded per SSPC SP2 or SP3 to achieve a 1-3 mil profile.
   6. Galvanizing shall exhibit a rugosity (smoothness) of less than 25 microns when measured by a profilometer. Profilometer shall be capable of operating in .1 micron increments. This pertains to those elements that are less than 24 pounds per running foot.

C. Primer over Galvanized Steel: Provide factory-applied polyamide thermosetting epoxy prime coat over hot-dipped galvanized steel.
   1. Basis-of-Design: **Duncan Primergalv® Thermoset**.
   2. Primer shall be a polyamide epoxy powder primer with 0 VOC.
   3. Apply primer within 12 hours after galvanizing or blasting at the same galvanizer's plant in a controlled environment meeting applicable environmental conditions and as recommended by the primer coating manufacturer. Cure schedule shall be as recommended by the manufacturer.
   4. Polyamide epoxy powder primer shall be applied at 1.8-3 mils DFT and certified OTC/VOC compliant and conform to EPA and local requirements.
   5. Polyamide epoxy powder primer shall meet or exceed the following performance criteria as stipulated by the coatings manufacturer:
      a. Cure Schedule: 10 min. at 400°F
      b. Specific Gravity: 1.58 +/- .05
      c. Coverage at 1.0 Mil 121.7 sq. ft./ lb.
      d. 60° Gloss: 55-65 (ASTM D-523)
      e. Adhesion: 5B (ASTM D-3359)
      f. Flexibility: Pass 1/8 " Mandrel Bend (ASTM D-522)
      g. Pencil Hardness: 2H-3H (ASTM D-3363)
      h. Impact Resistance: 80 in-lbs direct (ASTM D-2794) 80 in-lb reverse
      i. Typical Environmental Properties:On Bonderite 1000 Panels
         1) Salt Fog 1000 hours (ASTM B-117)
         2) Salt Fog (top-coated)* 5000+ hours (ASTM B-117)
         3) Humidity 1000 hours PASSED

D. Topcoat: Provide factory applied Super Durable Urethane powder topcoat in specified color and gloss range per approved samples.
   1. Super Durable Polyester Urethane Powder Topcoat shall be applied over primer per the manufacturer's recoat schedule at the same galvanizer's plant in a controlled environment meeting applicable environmental conditions as recommended by the coating manufacturer. Cure schedule shall be as recommended by the manufacturer.
   2. Super Durable Polyester Powder Urethane Topcoat shall be applied at 1.8-3 mils DFT and certified OTC/VOC compliant and conform to EPA and local requirements.

3. Super Durable Polyester Powder Urethane Topcoat shall meet or exceed the following performance criteria as stipulated by the coatings manufacturer:
   a. Specific Gravity: 1.58 +/- .05
   b. Coverage at 1.0 Mil 121.7 sq. ft./ lb.
   c. 60° Gloss: 55-65 (ASTM D-523)
   d. Adhesion: 5B (ASTM D-3359)
   e. Flexibility: Pass 1/8 " Mandrel Bend (ASTM D-522)
   f. Pencil Hardness: 2H-3H (ASTM D-3363)
   g. Impact Resistance: 80 in-lbs direct (ASTM D-2794) 80 in-lb reverse
   h. Typical Environmental Properties:On Bonderite 1000 Panels
      1) Salt Fog 1000 hours (ASTM B-117)
      2) Salt Fog (top-coated)* 5000+ hours (ASTM B-117)
      3) Humidity 1000 hours PASSED

E. Clear Coat: Provide Super Durable Clear Coat in the gloss range specified.
   1. Super Durable Polyester Powder Urethane Clear Coat shall be applied over the color coat per the manufacturer's recoat schedule at the same galvanizer's plant in a controlled environment meeting applicable environmental conditions as recommended by the coating manufacturer. Cure schedule shall be as recommended by the manufacturer.
   2. Super Durable Polyester Powder Urethane Topcoat shall be applied at 2-3 mils DFT and certified OTC/VOC compliant and conform to EPA and local requirements.
   3. Super Durable Urethane Powder Clear Coat shall meet or exceed the following performance criteria as stipulated by the coatings manufacturer:
      a. Cure Schedule 10 min @400ºF
      b. Specific Gravity (g/ml): 1.17
      c. Coverage at 1.0 Mil (ft^2/lb) 165.2
      d. 20º Gloss (ASTM D-523) 99
      e. 60º Gloss (ASTM D-523) 110
      f. Adhesion (ASTM D-3359) 5B
      g. Flexibility : Pass 1/8 " Mandrel Bend (ASTM D-522)
      h. Pencil Hardness: (ASTM D-3363) H-2H
      i. Impact resistance ASTM D-2794) Direct 100 in-lbs Reverse 100 in-lbs
      j. Humidity (ASTM D-4585) Slight gloss and color change
      k. Salt Spray (ASTM B-117) Max 1/8" Creepage

F. Warranty: Provide galvanizer's standard warranty that materials will be free from 10 percent or more visible rust for 20 years.

PART 3 - EXECUTION

3.1 APPLICATION OF FACTORY-APPLIED METAL COATINGS

A. Galvanizing Application: Galvanize materials in accordance with specified standards and this specification. Galvanizing shall provide an acceptable substrate for applied coatings. The dry kettle process shall be used to eliminate any flux inclusions on the surface of the galvanized material.

B. Prior to galvanizing, the steel shall be immersed in a pre-flux solution (zinc ammonium chloride). The pre-flux tank must be 12 to 14 Baumé density and contain less than 0.4 percent iron. Use of the wet kettle process is not acceptable. To provide the galvanized surface required, the following procedures shall be implemented:
   1. A monitoring recorder shall be utilized and inspected regularly to observe any variances in the galvanizing bath temperature.

2. The pickling tanks shall contain hydrochloric acid with an iron content less than 8 percent and zinc content less than 3 percent. Titrations shall be taken weekly at a minimum.
3. All chemicals and zinc shall be tested at least once a week to determine compliance with ASTM standards. All testing shall be done using atomic absorption spectrometry or x-ray fluorescence (XRF) equipment at a lab in the galvanizing plant.

C. Finish coatings shall be applied under the following conditions.
1. Minimum air temperature shall be 50 degrees F. Surface temperature of steel shall be 50 degrees to 120 degrees F and, in any event, be 5 degrees F higher than the dew point. Humidity shall be 85 percent maximum.
2. The use of iron, steel shot, and aluminum oxide grit as a blast medium, and power wire brushes are not permitted.
3. Surface of substrate shall be dry and free from dust, dirt, oil, grease or other contaminants. Coating and cure facility shall be maintained free of airborne dust and dirt until coatings are completely cured.

3.2 INSTALLATION

A. Installation: Comply with fabricator's and galvanizer's requirements for installation of materials and fabrications, including use of nylon slings or padded cables for handling factory-coated materials.

B. Touch-Up and Repair: For damaged and field-welded metal coated surfaces, clean welds, bolted connections and abraded areas.
1. For galvanized surfaces, apply organic zinc repair paint complying with requirements of ASTM A 780, modified to 95 percent zinc in dry film. Galvanizing repair paint shall have 85 percent zinc by weight. ZiRP by Duncan Galvanizing or a Zinc Rich Organic coating may be used. Thickness of applied galvanizing repair paint shall be not less than coating thickness required by ASTM A 123 or A 153 as applicable. Touch-up of galvanized surfaces with silver paint, brite paint, or aluminum paints is not acceptable.
2. For factory-applied finish coatings, field-touch-up shall be performed by factory approved personnel for warranties to apply. Touch-up shall be such that repair is not visible from a distance of 6 feet.
3. A touch-up repair kit and touchup instructions shall be provided to the Owner for each type of factory-applied finish upon request.

END OF SECTION