A. Related Sections:
13 Division 01 Section “Sustainable Design Requirements”.
14 Division 05 Section “Pipe and Tube Railings”.
15 Division 05 Section “Decorative Metal”.
16 Division 05 Section “Decorative Metal Railings”.
17 Division 05 Section “Decorative Formed Metal”.
18 Division 07 Section “Metal Roof Panels”.
19 Division 07 Section “Metal Wall Panels”.
1.0 Division 07 Section “Sheet Metal Roofing”.
1.1 Division 07 Section “Sheet Metal Flashing and Trim”.
1.2 Division 07 Section “Roof Specialties”.
1.3 Division 08 Section “Overhead Coiling Doors”.
1.4 Division 08 Section “Overhead Coiling Grilles”.
1.5 Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
1.6 Division 08 Section “All-Glass Entrances and Storefronts”.
1.7 Division 08 Section “Automatic Entrances”.
1.8 Division 08 Section “Revolving Door Entrances”.
1.9 Division 08 Section “Glazed Aluminum Curtain Walls”.
1.0 Division 08 Section “Structural-Sealant-Glazed Curtain Walls”.
1.1 Division 08 Section “Aluminum Windows”.
1.2 Division 08 Section “Metal-Framed Skylights”.
1.3 Division 08 Section “Louvers and Vents”.
1.4 Division 10 Section “Metal Lockers”.
1.5 Division 13 Section “Metal Building Systems”.
1.6 Division 08 Section “Louvers and Vents”.

SECTION 050513 - SHOP-APPLIED COATINGS FOR METAL
SECTION 05080 - FACTORY-APPLIED METAL COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
12 Shop-applied coatings for architectural metals.
REFERENCES

A. American Architectural Manufacturers Association (AAMA):
   1.27 AAMA 621 - Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates
   1.28 AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
   1.29 AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions
   1.30 AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions
   1.31 AAMA 643 – Voluntary Specification, Performance Requirements and Test Procedures for Solar Reflectance Finishes

B. ASTM International (ASTM):
   1.32 ASTM B 117 - Practice for Operating Salt Spray (Fog) Apparatus.
   1.33 ASTM G 85 annex 5 – Modified Salt Spray Cyclic Fog Test.
   1.36 ASTM D 2244 - Test Method for Calculation of Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
   1.38 ASTM D 3363 - Standard Test Method for Film Hardness by Pencil Test.


PERFORMANCE REQUIREMENTS

A. Solar Reflective Index (SRI): Provide metal roof panel coatings with an initial SRI of not less than 82 or a 3-year aged SRI of 64 for slopes of 2:12 or less, and an initial SRI of 39 or a 3-year aged SRI of 32 for slopes greater than 2:12, per ASTM E 1980.

B. ENERGY STAR Compliance: Provide metal roof panel coatings identical to those listed on U.S. Department of Energy’s ENERGY STAR Roof Products Qualified Product List.

C. CEC-Title 24 Compliance: Provide metal roof panel coatings with initial solar reflectance not less than 0.70 and emissivity not less than 0.75 per CRRC-1.

SUBMITTALS

A. Product Data: For each type of coating product specified.
B. LEED Submittals:
   1.44 Product Test Reports for Credit SS10C5: Heat Island Reduction: For metal roof panel coatings to document compliance with solar reflectance index (SRI) requirement.
A. Samples for Selection: For each color, gloss specified.
B. Samples for Verification: For each coating product, for each color, gloss and texture specified, on specified substrate.
C. Product test reports.
D. Qualifications: For shop-applied coatings Applicator.
E. Maintenance data.
F. Warranty: Sample of special warranty.

145 QUALITY ASSURANCE

A. Applicator Qualifications: Coating manufacturer’s approved certified applicator, equipped, trained and approved for application of coatings required for this Project, and is approved to provide warranty specified in this Section.

146 DELIVERY, STORAGE, AND HANDLING

A. Deliver, unload and store shop-coated items so that they remain free of damage or deformation. Package and protect items during shipping and handling. Protect stored items from water; stack to facilitate drainage. Keep shop-coated items out of contact with materials that may adversely affect the coating.
B. Protect shop-coated items with protective covering until installed.

147 COORDINATION

A. Coordinate submittal and selection procedures for items to receive shop-applied coatings. Where items are indicated to match coatings selected for other items, adjust formulations as required to achieve match. Submit samples for verification indicating compliance with matching requirements.

148 WARRANTY

A. Coating Warranty: Coating Applicator’s warranty in which Applicator agrees to repair finish or replace coated items that demonstrate deterioration of shop-applied finishes within warranty period indicated.

B. Exposed Coating: Deterioration includes but is not limited to:
   a. Color fading in excess of 5 Delta E Hunter units per ASTM D 2244.
   b. Peeling, checking or cracking of coating adhesion to metal.
   c. Chalking in excess of a No. 8 per ASTM D 4214, when tested per Method D 659.
   d. Corrosion of substrate in excess of a No. 6 on cut edges and a No. 8 on field surfaces, when measured per ASTM D 1654.
PART 2 - PRODUCTS

2.0 MANUFACTURERS

A. Basis-of-Design Product: Provide shop-applied coatings manufactured by PPG, Pittsburgh, PA; (888) 774-4332; Email: ideascapes@ppg.com; Website: www.ppgideascapes.com or comparable products of another manufacturer approved by Architect prior to bid.

2.1 APPROVED COATING APPLICATORS

A. Acceptable Applicators: Provide shop-applied coatings applied by one of the following manufacturer-approved manufacturer-certified applicators:

<Insert list of acceptable applicators>

SUPERIOR & HIGH-PERFORMANCE ORGANIC FINISH MATERIALS – EXTRUSION COATINGS

A. Liquid Fluoropolymer Aluminum Extrusion Coatings, AAMA 2605: Minimum 70% PVDF resin, by weight, in color coat and clear topcoat

2.2 Product: PPG Duranar, Duranar Sunstorm

Dry Film Thickness, ASTM D 1400: 0.20 mil primer coat plus 1.0 mil color coat, 1.20 mil total, minimum thickness [two-coat system]

2.3 Product: PPG Duranar XL, Duranar GR

Dry Film Thickness, ASTM D 1400: 0.20 mil primer coat plus, 1.0 mil color coat and 0.4 mil clear topcoat or Duranar GR clear topcoat, 1.6 mil total minimum thickness [three-coat system]

2.4 Product: PPG Duranar XLB

Dry Film Thickness, ASTM D 1400: 0.20 mil primer coat plus 1.0 mil barrier coat, 1.0 mil color coat and 0.4 mil clear topcoat, 2.6 mil total minimum thickness [four-coat system]. Barrier coat is color dependent and required when color coat has low hiding power.

Seacoast and Severe Environments:

a. Pretreatment: A chromium chromate or chromium phosphate coating weight range is required between 80 - 120 mg/ft² as measured by x-ray fluorescence (XRF) per ASTM D5723-95

b. Primer: Liquid chromate primer under liquid and powder topcoats or powder primer under powder topcoats.

c. Clear coat: Optional protection, except for metallic flake or as another barrier coat that can easily be rinsed with fresh water to eliminate salt residue or used to improve chalk and fade resistance

B. Liquid Fluoropolymer Aluminum Extrusion Coatings, AAMA 2604: 50% PVDF resin, by weight, in color coat

2.5 Product: PPG Acrynar

Dry Film Thickness, ASTM D 7901: 0.20 mil primer coat plus 1.0 mil color coat, 1.2 mil total minimum thickness [two-coat system]

Seacoast and Severe Environments:

a. Pretreatment: A chromium chromate or chromium phosphate coating weight range is required between 80 - 120 mg/ft² as measured by x-ray fluorescence (XRF) per ASTM D5723-95

b. Primer: Liquid chromate primer
C. Powder Fluoropolymer Aluminum Extrusion Coatings, AAMA 2605 Minimum 70% PVDF resin, by weight, in color coat

2.6 Product: PPG Duranar Powder Coating for normal and severe environments
   Dry Film Thickness, ASTM D 7901: 0.20-0.30 mil liquid primer coat or 1.5-3.0 powder primer plus 2.0-4.0 mil Duranar powder topcoat, 3.7 – 7.3 mil total minimum thickness
   Seacoast and Severe Environments:
   a. Pretreatment: A chromium chromate or chromium phosphate coating weight range is required between 80-120 mg/ft² as measured by x-ray fluorescence (XRF) per ASTM D5723-95
   b. Primer: Liquid chrome primer and powder topcoats or powder primer under powder topcoats

D. Powder Fluoropolymer Aluminum Extrusion Coatings, Fluoropolymer, AAMA 2605

2.7 Product: PPG Coraflon Powder Coating – one-coat for normal environments
   Dry Film Thickness, ASTM D 7901: 2.0 – 4.0 mil, minimum thickness.

2.8 Product: PPG Coraflon Powder Coating – two-coat for severe environments
   Dry Film Thickness: 0.20-0.30 mils of liquid primer or 1.5-3.0 mils of powder primer plus 2.0-4.0 mil of Coraflon topcoat
   Seacoast and Severe Environments:
   a. Pretreatment: A chromium chromate or chromium phosphate coating weight range is required between 80-120 mg/ft² as measured by x-ray fluorescence (XRF) per ASTM D5723-95
   b. Primer: Chrome powder primer under and powder topcoats or powder primer under powder topcoats.

E. Powder Polyester Aluminum Extrusion Coatings, AAMA 2604

2.9 Product: PPG Envirocron 04 Ultra-Durable Powder Coating
   Dry Film Thickness, ASTM D 7901: 2.0-4.0 mil

HIGH-PERFORMANCE ORGANIC FINISH MATERIALS – COIL COATINGS

A. Liquid Fluoropolymer Aluminum Sheet Coil Coatings, AAMA 2605: 70 percent PVDF resin, by weight, in color coat and clear topcoat

2.10 Product: PPG Duranar, Duranar Sunstorm, Duranar ULTRA-Cool
   Dry Film Thickness, ASTM D 7901: 0.15 mil primer coat plus 0.70 mil color coat, 0.85 mil total, minimum thickness [two-coat system].

2.11 Product: PPG Duranar XL, Duranar GR.
   Dry Film Thickness, ASTM D 7901: 0.15 mil primer coat plus 0.70 mil color coat and 0.45 mil clear topcoat or Duranar GR clear topcoat, 1.3 mil total minimum thickness [three-coat system].

2.12 Product: PPG Duranar XLB
   Dry Film Thickness, ASTM D 7901: 0.15 mil primer coat plus 0.70 mil barrier coat, 0.70 mil color coat and 0.45 mil clear topcoat or Duranar GR clear topcoat, 2.0 mil total minimum thickness [four-coat system]. Barrier coat is color dependent and required when color coat has low hiding power.

B. Liquid Fluoropolymer Aluminum Sheet Coil Coatings, AAMA 2605: FEVE resin, clear topcoat.

2.13 Product: PPG Coraflon XL, Coraflon GR
   Dry Film Thickness, ASTM D 7901: 0.6 mil clear coat or Coraflon GR clear topcoat over Duranar color coat.
   Gloss Range: 20-80
C. **Liquid Fluoropolymer Steel** Sheet Coil Coatings, AAMA 621: Minimum 70 percent PVDF resin, by weight, in color coat and clear topcoat

2.14 Product: **PPG Duranar, Duranar Sunstorm, Duranar ULTRA-Cool**
   - Dry Film Thickness, ASTM D 7901: 0.15 mil primer coat plus 0.70 mil color coat, 0.85 mil total minimum thickness [two-coat system]

2.15 Product: **PPG Duranar Plus, Duranar ULTRA-Cool Plus, Seacoast**
   - Dry Film Thickness, ASTM D 7901: 0.80 mil primer coat plus 0.80 mil color coat, 1.60 mil total minimum thickness [two-coat system]

2.16 Product: **PPG Duranar XL, Duranar GR**
   - Dry Film Thickness, ASTM D 7901: 0.15 mil primer coat plus 0.70 mil color coat and 0.45 mil clear topcoat, 1.30 total minimum thickness [three-coat system]

2.17 Product: **PPG Duranar XL Plus, Duranar XL ULTRA-Cool Plus, Seacoast**
   - Dry Film Thickness, ASTM D 7901: 0.80 mil primer coat plus 0.80 mil color coat and 0.80 clear topcoat, 2.40 Mil total minimum thickness [three-coat system]. Barrier coat is color dependent and required when color coat has low hiding power.

Seacoast and Severe Environments:
   a. Pretreatment: A chromium chromate or chromium phosphate coating weight range is required between 80-120 mg./ft.² as measured by x-ray fluorescence (XRF) per ASTM D5723-95.
   b. Primer: Thick film liquid chromate primer under liquid topcoat.
   c. Clear coat: Optional protection, except for metallic flake or as another barrier coat that can easily be rinsed with fresh water to eliminate salt residue or used to improve chalk and fade resistance.

D. **Liquid Fluoropolymer Steel** Sheet Coil Coatings, AAMA 621: FEVE resin, clear topcoat

2.18 Product: **PPG Coraflon XL, Coraflon GR over Duranar color coat**
   - Dry Film Thickness, ASTM D 7901: 0.6 mil clear coat
   - Gloss Range: 20-80

### INTERIOR & EXTERIOR ORGANIC FINISHING MATERIALS – EXTRUSION COATINGS

A. Liquid acrylic and polyester one-coat finishes meeting AAMA 2603
   1. Product: **PPG Duracron, Polycron**
      - Dry Film Thickness, ASTM D1400: 1.0 mil +/- 0.2 mil.

B. Powder polyester one-coat finish meeting AAMA 2603
   1. Product: **PPG Envirocron 03**
      - Dry Film Thickness, ASTM1-400: 2.5 mils +/- 0.5.

### INTERIOR ORGANIC FINISHING MATERIALS – COIL COATINGS

C. Liquid acrylic and polyester one coat finish:
   1. Product: **PPG Duracron**
   2. Dry Film Thickness, ASTM D1005: 0.75-0.85 mils.

**FINISHES**

A. Pretreatment: Mechanically clean and chemically pretreat fabricated items in accordance with coating manufacturer’s requirements and AAMA requirements for finish indicated.

B. Application: Apply primer and finish coats in accordance with coating manufacturer’s requirements for finish indicated.
SHOP-APPLIED COATINGS SCHEDULE

SUPERIOR AND HIGH-PERFORMANCE ORGANIC LIQUID FINISHES
FOR ALUMINUM AND STEEL EXTENSIONS

A. High-Performance Organic Liquid Finish for Aluminum Extruded Items: [2-coat] [3-coat] [4-coat] fluoropolymer finish: AAMA 2604 or AAMA 2605.
Coated Items: <Insert list of extruded items to receive high-performance organic finish>
Color: [Match custom sample] [As selected from manufacturer’s full range] [As designated or scheduled]
<Insert color>.
Gloss: [10-40] [As selected from manufacturer’s full range] [As designated or scheduled].

B. High-Performance Organic Liquid Finish for Aluminum Sheet Items: [2-coat] [3-coat] [4-coat] fluoropolymer finish: AAMA 2605.
Coated Items: <Insert list of extruded items to receive high-performance organic finish>
Color: Match custom sample [As selected from manufacturer’s full range] [As designated or scheduled]
<Insert color>.
Gloss: [10-80] [As selected from manufacturer’s full range] [As designated or scheduled].
Concealed/Backer Finish: Pretreat substrate and apply coating applicator’s standard acrylic, polyester or epoxy finish in accordance with manufacturers’ requirements.

C. High-Performance Organic Liquid Finish for Steel Sheet Items: [2-coat] [3-coat] [4-coat] fluoropolymer finish: AAMA 621.
Coated Items: <Insert list of extruded items to receive high-performance organic finish>
Color: [Match custom sample] [As selected from manufacturer’s full range] [As designated or scheduled]
<Insert color>.
Gloss: [10-80] [As selected from manufacturer’s full range] [As designated or scheduled].
Concealed/Backer Finish: Pretreat substrate and apply coating applicator’s standard acrylic, polyester or epoxy finish in accordance with manufacturers’ requirements.

SUPERIOR AND HIGH-PERFORMANCE ORGANIC POWDER FINISHES FOR ALUMINUM AND STEEL EXTENSIONS

A. High-Performance Powder Finish for Aluminum Extruded Items (AAMA 2604 or 2605) and Steel Items Fabricated from Shapes and Plates:
Coated Items: <Insert list of extruded items to receive high-performance organic finish>
Color: [Match custom sample] [As selected from manufacturer’s full range] [As designated or scheduled]
<Insert color>.
Gloss: [Medium, 20 - 80] [As selected from manufacturer’s full range] [As designated or scheduled].
Surface: [Smooth] [Rough texture, glossy surface] [Fine texture] [As selected from manufacturer’s full range] [As designated or scheduled].

PART 3 - EXECUTION

3.1 INSTALLATION
A. Refer to individual specifications sections for installation requirements for items receiving shop-applied coatings.

3.2 PROTECTION
A. Remove protective wrap from coated items at time of installation.

[END OF SECTION 05 5 13]

[END OF SECTION 05]