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# PPG Guide Specification –
# Coil and Extrusion Coatings, Liquid and Powder Coating Systems

**SECTION 050513 - SHOP-APPLIED COATINGS FOR METAL**

**SECTION 05080 - FACTORY-APPLIED METAL COATINGS**

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

## PART 1 - GENERAL

1.1 SUMMARY

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

A. Related Sections:
1.3 Division 01 Section “Sustainable Design Requirements”.
1.4 Division 05 Section “Pipe and Tube Railings”.
1.5 Division 05 Section “Decorative Metal”.
1.6 Division 05 Section “Decorative Metal Railings”.
1.7 Division 05 Section “Decorative Formed Metal”.
1.8 Division 07 Section “Metal Roof Panels”.
1.9 Division 07 Section “Metal Wall Panels”.
1.10 Division 07 Section “Sheet Metal Roofing”.
1.11 Division 07 Section “Sheet Metal Flashing and Trim”.
1.12 Division 07 Section “Roof Specialties”.
1.13 Division 08 Section “Overhead Coiling Doors”.
1.14 Division 08 Section “Overhead Coiling Grilles”.
1.15 Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
1.16 Division 08 Section “All-Glass Entrances and Storefronts”.
1.17 Division 08 Section “Automatic Entrances”.
1.18 Division 08 Section “Revolving Door Entrances”.
1.19 Division 08 Section “Glazed Aluminum Curtain Walls”.
1.20 Division 08 Section “Structural-Sealant-Glazed Curtain Walls”.
1.21 Division 08 Section “Aluminum Windows”.
1.22 Division 08 Section “Metal-Framed Skylights”.
1.23 Division 08 Section “Louvers and Vents”.
1.24 Division 10 Section “Metal Lockers”.
1.25 Division 13 Section “Metal Building Systems”.
1.26 Division 08 Section “Louvers and Vents”.

## 1.27 REFERENCES

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

B. ASTM International (ASTM):
1.33 ASTM B 117 - Practice for Operating Salt Spray (Fog) Apparatus.
1.34 ASTM G 85 annex 5 – Modified Salt Spray Cyclic Fog Test.
1.35 ASTM D 7091 - Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base.
1.36 ASTM D 1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
1.37 ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
1.38 ASTM D 2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
1.39 ASTM D 3363 - Standard Test Method for Film Hardness by Pencil Test.
1.40 ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
1.41 ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
C. U.S. Green Building Council (USGBC): LEED Green Building Rating System, NC (New Construction) Version 4.

## 1.42 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.

## 1.43 SUBMITTALS

A. Product Data: For each type of coating product specified.
B. LEED Submittals:
1.44 Product Test Reports for Credit SSpC5: 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.

1.5 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.

1.6 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.

1.7 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.

1.8 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.
   e. Warranty Period: [5] [10] [20] [25] [30] years from date of substantial completion.

**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 7091: 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 7091: 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 7091: 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 to be greater than 40 mg/ft$^2$ 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 7091: 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 to be greater than 40 mg/ft.$^2$ 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 7091: 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 to be greater than 40 mg/ft$^2$ 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 7091: 2.0 – 4.0 mil, minimum thickness.

2.8 Product: **PPG *Coraflon* Powder Coating** – two-coat for severe environments
Pretreatment: A chromium chromate or chromium phosphate coating weight range is required to be greater than 40 mg./ft.$^2$ as measured by x-ray fluorescence (XRF) per ASTM D5723-95.
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 to be greater than 40 mg/ft$^2$ 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 7091: 2.0-4.0 mil

F.

**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 7091: 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 7091: 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 7091: 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 7091: 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 7091: 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 7091: 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 7091: 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 7091: 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].

2.18 Product: **PPG *Duranar* XLB**
Dry Film Thickness, ASTM D 7091: 0.20 mil primer coat plus 0.80 barrier coat, 0.80 mil color coat and 0.40 clear topcoat, 2.20 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 to be greater than 40 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 7091: 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***
2. Dry Film Thickness, ASTM D 7091: 1.0 mil +/- 0.2 mil.

B. Powder polyester one-coat finish meeting AAMA 2603
1. Product: **PPG *Envirocron* 03**
2. Dry Film Thickness, ASTM D 7091: 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 D 7091: 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**