SECTION 975
STRUCTURAL COATING MATERIALS

975-1 General Requirements.

975-1.1 General: Upon curing, all coatings and/or coating systems must produce an adherent coating that is visually uniform. The composition of the coating is left to the discretion of the manufacturer but the finished product shall meet all requirements of this Section. All coats of multi-coat systems shall be supplied by the same manufacturer. Multi-component coatings shall be prepackaged in the required ratios.

975-1.2 Environmental Requirements: Coating materials and their waste shall be characterized as non-hazardous as defined by Resource Conservation and Recovery Act (RCRA) Subarticle C rules, Table 1 of 40 CFR 261.24 Toxicity Characteristic.

Volatile Organic Compounds (VOC) shall be less than 3.5 lb/gal when tested in accordance with ASTM D3960.

975-1.3 Approved Product List (APL): All polymeric coating materials except the materials in 975-4 shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their products shall submit the product data sheets, performance test reports from an independent laboratory showing the product meets the requirements of this Section, a Product SDS or performance test reports showing percent weight compositional analysis including Chemical Abstract Number, ACGIH time weighted average and ceiling exposure limits for all components, lower and upper explosive limits, flash point, boiling point, amount of volatile organic compounds by weight, and specific gravity for each component of the coating system, and a APL application in accordance with Section 6.

975-1.4 Packaging and Labeling: Materials shall be shipped in containers legibly marked with application instructions, lot number, batch number, date of manufacture, shelf life, and Department APL number. Each lot or batch manufactured must have a unique number.

975-2 Structural Steel Coating Systems.

975-2.1 General: Structural steel coatings shall meet the application requirements of Section 560.

975-2.2 Performance Requirements: Outdoor exposure testing will be performed by the Department. Prepare four composite and four flat-scribed test panels in accordance with AASHTO R-31 (FED-STD-595, Shade X6134 or X4062) and submit to the State Materials Office (SMO). Also submit ~~1~~ one quart wet samples of each component of each coating incorporated in the system being evaluated. Panels will be exposed at the Department's outdoor test site in accordance with ASTM G7. All coatings, regardless of color, shall meet the requirements below.

Laboratory Testing		
Property	Test Method	Requirement
Slip Coefficient	AASHTO R31	Min. Class B (primer only)
Salt Fog Resistance	AASHTO R31	Blister Size = 10 Average Rust Creep at the Scribe ≤ 0.1 inches
Cyclic Weathering	AASHTO R31	Blister Size = 10

Resistance		Average Rust Creep at the Scribe ≤ 0.2 inches, Color Retention ΔE ≤ 8, Gloss loss less than 30 units
Abrasion Resistance	AASHTO R31	Wear Index ≤ 2.7 mg/cycle
Adhesion	AASHTO R31	Avg. system tensile strength ≥ 800 psi
Freeze Thaw Stability	AASHTO R31	Avg. tensile strength ≥ 800 psi
Coatings Identification	Fourier Transform Infrared Spectroscopy	IR scan (2.5 to 15 um) for each base, catalyst, and mixed coating.
Impact Resistance	ASTM D2794	Greater than 25 inch/lbs, 1/2" impact, intrusion
Flexibility	AASHTO R31, ASTM D522, 1 inch cylindrical mandrel	No cracking
Outdoor Testing		
Property	Test Method	Requirement
Rusting	ASTM D610 ASTM D1654 (scribed) ASTM D1654 (un-scribed)	≥ 9 after 5 years ≥ 9 after 5 years ≥ 9 after 5 years
Blistering	ASTM D714	10 after 5 years
Adhesion	ASTM D4541;annex A4	≥ 800 psi (un-scribed area) after 5 years
Color Retention	ASTM D2244	ΔE ≤ 8 after 2 years
Gloss	ASTM D523	≤ 30 gloss units after 2 years

975-2.3 Structural Steel Coating Systems for New Structures.

975-2.3.1 High Performance Coating Systems (Color Pigmented):

975-2.3.1.1 Prime Coat: Zinc dust pigment shall be a minimum of Type II in accordance with ASTM D520. Inorganic zinc rich primers shall meet the requirements of the Society for Protective Coatings (SSPC) Paint 20, Type I, Level 2.

975-2.3.1.2 Intermediate Coat: Intermediate coatings, when required by the manufacturer, shall be a component of the full coating system.

975-2.3.1.3 Finish Coat: The finish coat shall provide the color and gloss required for the completed coating system. A finish coat may be comprised of a single pigmented coat or a pigmented coat with a clear coat. The clear coat shall contain a dissipating colorant. The dissipating colorant shall be visible for a minimum of 12 hours after application and shall completely dissipate within 96 hours after application.

975-2.3.2 Inorganic Zinc Coating System: Zinc dust pigment shall be a minimum of Type II in accordance with ASTM D 20. Inorganic zinc rich primers shall meet the requirements of SSPC Paint 20, Type I, Level 2. The performance requirements for gloss and color retention are not applicable.

975-2.3.3 Interior Box Girder Coating System:

975-2.3.3.1 Prime Coat: Inorganic zinc dust pigment shall be a minimum of Type II in accordance with ASTM D520. Inorganic zinc rich primers shall meet the requirements of SSPC Paint 20, Type I, Level 2.

975-2.3.3.2 Finish Coat: The finish coat shall be one coat of white polyamide or cycloaliphatic amine epoxy coating. The performance requirements for gloss and color retention are not applicable.

975-2.4 Structural Steel Coating Systems for Existing Structures.

975-2.4.1 Prime Coat: Zinc dust pigment shall be a minimum of Type II in accordance with ASTM D520. Organic zinc rich primers shall meet the requirements SSPC Paint 20, Type II, Level 2.

Zinc primers shall be used as galvanizing repair compounds for areas greater than 100 square inches.

975-2.4.2 Intermediate Coat: Intermediate coatings, when required by the manufacturer, shall be a component of the full coating system.

975-2.4.3 Finish Coat: Finish coating shall provide the color and gloss required for the completed coating system. A finish coat may be comprised of a single pigmented coating or a pigmented coating with a clear coat. The clear coat shall contain a dissipating colorant. The dissipating colorant shall be visible for a minimum of 12 hours after application and shall completely dissipate within 96 hours after application.

975-3 Galvanized Steel Coating System.

Coatings applied over galvanized steel shall meet the outdoor exposure requirements of 975-2.2 with the exception that test panels shall be galvanized in accordance with ASTM A123 prior to application of subsequent coatings.

Coatings applied over galvanized steel strain poles, mast arms, and monotube assemblies shall meet the requirements of Section 649 and 975-4.

975-4 Painting Strain Poles, Mast Arms and Monotube Assemblies.

Paint systems used on galvanized steel strain poles, galvanized steel mast arms and galvanized steel monotube assemblies shall meet the color requirements as specified in the Contract Documents and shall exhibit no loss of adhesion or loss of color greater than 8ΔEs for five years after final acceptance as specified in 5-11. A galvanized steel strain pole, mast arm or monotube assembly that exhibits a cumulative surface area of delamination in excess of 100 square inches will constitute an adhesion failure. Delamination shall be defined as any area of exposed metal surface subsequent to hand tool cleaning in accordance with SSPC-SP2. A change in the coating color in excess of 8ΔEs per the CIE L*a*b* 1976 will constitute a color retention failure. The Department will measure the CIE 1976 color chromaticity coordinates for the color of the top coat of the two sample coupons provided with a BYK-Gardner Handicolor colorimeter using D65 illuminant and 2 degree geometry settings. The Department-measured L*a*b* chromaticity coordinates shall define the initial color and will be used for resolution of color retention failures and the resolution of color retention disputes. All paint systems shall possess physical properties and handling characteristics that are compatible with the application

requirements of Section 649. Materials shall be specifically intended for use over galvanized steel.

975-5 Elastomeric Coatings.

975-5.1 General: Use an elastomeric coating system to provide a waterproof barrier over post-tensioning anchorages or other areas designated in the Plans. The components of the coating system shall be supplied by a single manufacturer and sold as a waterproof coating system. The surface preparation and application of the coating system shall be performed in strict accordance with the manufacturer's specifications.

975-5.2 Physical Properties: The use of an epoxy prime coat is dependent upon the requirements of the manufacturer's waterproofing system. The polyurethane chemistry may be either waterborne aromatic (moisture-curing) or aromatic (moisture-sensitive). The minimum thickness of the system shall not be less than 30 mils. The elastomeric coating shall meet the following requirements:

Property	Test Method	Requirement
Hardness, Shore A	ASTM D2240	Between 60 and 90
Tensile Strength	ASTM D412	≥750 psi
Elongation	ASTM D412	≥400%
Tear Strength	ASTM C957	>70 pli
Abrasion Resistance H-18 wheels 1,000 gm/wheel	ASTM C957	≤350 mg loss / 1,000 revs.
Crack Bridging 1,000 Cycles	ASTM C957	System Passes
Elongation Recovery	ASTM C957	≥94%

975-5.3 System Modifications for Use on Bridge Substructure: Supply the elastomeric coating system with a 100% acrylic aliphatic polyurethane top coating.

975-6 Class 5 Applied Finish Coatings.

975-6.1 General: All coatings shall possess physical properties and handling characteristics compatible with the application requirements of Section 400. Unless otherwise specified, the color of the finish coat shall meet FED-STD-595, Table VIII, Shade No. 36622, or No. 36642 for uncoated weathering steel bridges.

975-6.2 Coating Requirements: ~~Use~~Prepare four, 4 inch by 8 inch (except as required below) fiber cement test panels with a mass of 7 to 9 pounds per square foot of surface area to perform the laboratory tests. Apply the finish coating to each test panel at a rate of 50 square feet per gallon, plus or minus~~,~~ 10 square feet per gallon. Seal the corners of all test panels with a high build epoxy or equivalent to prevent moisture ingress at corners and cut edges. Submit the samples to an independent laboratory for testing. Coating performance shall meet the following requirements:

Laboratory Testing		
Property	Test Method	Requirement

Laboratory Testing		
Property	Test Method	Requirement
Resistance to Wind Driven Rain	ASTM D6904	No visible water leaks, and if the rear face of the block is damp, the average gain in weight of the three 8”x16”x2” blocks must be less than 0.2 lb.
Freeze thaw resistance	AASHTO R31	No disbondment
Water Vapor Transmission	ASTM D1653; Method B, Condition C	WVT≥10 perms
Abrasion Resistance	ASTM D968, 3,000 liters of sand	No loss of coating thickness ASTM D6132
Salt Spray (fog) resistance	ASTM B117, 2,000 hours	No disbondment
Fluorescent UV-Condensation Exposure	ASTM D4587, 2000 hours, 4 hours UV, 4 hours condensation	No blistering (ASTM D714), cracking (visual), or delamination (visual). chalking (ASTM D4214Method D) rating no less than 8.
Fungal Resistance	ASTM D3273	Rating of 10, ASTM D3274

~~Submit~~Include ~~four fiber cement test panels and~~ a ~~1~~ one quart wet sample of each component of each coating incorporated in the total system being evaluated with the submitted APL application. ~~Prepare test panels by applying the finished coating at a rate of 50 plus or minus 10 square feet per gallon. In addition, completely seal the corners of all test panels with a high build epoxy or equivalent to prevent moisture ingress at corners and cut edges.~~

975-7 Anti-Graffiti Coating Materials.

975-7.1 General Requirements: Anti-graffiti coatings intended for use under this specification shall be of a composition capable of preventing the adhesion of and facilitating the removal of acrylic, polyurethane, and alkyd spray paint. All anti-graffiti coatings shall possess the physical and handling characteristics that are compatible with the requirements of Section 563. The manufacturer shall designate the non-sacrificial product as water cleanable or solvent cleanable in accordance with this Section.

Anti-graffiti coatings shall contain less than 5.0 lb per gallon volatile organic compounds (VOC) as defined by 40 CFR Part 59, Subpart D, evaluated as per ASTM D3960.

The manufacturer shall supply the following additional information:

1. Technical data sheet that includes installation instructions and graffiti removal instructions, including any solvents or other materials, as necessary. Graffiti removal must be accomplished with nonproprietary cleaners as defined in ASTM D6578.
2. Sacrificial Coating Removal instructions, as applicable.
3. Certification that non-sacrificial anti-graffiti coating shall not blister, crack, check, chalk, delaminate, or exhibit a color change of more than 8 dE94 (or dE76) CIE LAB units for a period of one year after installation.

975-7.2 Performance Requirements: For laboratory testing, use flat test panels prepared in accordance with AASHTO R31. Outdoor exposure testing will be performed by the Department. Submit four, 4 inch by 8 inch fiber cement test panels to the SMO. Panels will be

exposed at the Department's outdoor test site in accordance with ASTM G7. Coating performance shall meet the following requirements:

Laboratory Testing - Non-Sacrificial		
Property	Test Method	Requirement
Graffiti Resistance (solvent cleanable)	ASTM D6578. Complete removal of solvent-based acrylic, polyurethane, and alkyd spray paint; after exposure; and recleanability	Cleanability Level 8, 9, or 10, Accelerated or outdoor exposure is not required. Cure per the spray paint manufacturer's requirements and assess cleanability per Section 10 of ASTM D 6578.
Fluid Resistance (solvent cleanable)	ASTM D1308 – Spot Test, Paint Thinner, Gasoline	No blistering, discoloration, softening or adhesion loss.
Outdoor Exposure Testing – Non-Sacrificial		
Property	Test Method	Requirement
Graffiti Resistance (water cleanable)	ASTM G7: 6 months exposure at FDOT test site 2500 psi using pressure washer	Complete removal of solvent based acrylic, polyurethane, and alkyd based spray paint. No delamination or visual defects.

Laboratory Testing - Sacrificial		
Property	Test Method	Requirement
Cyclic Weather Testing	AASHTO R31: no salt fog, 95°F, 0%- 90% Relative Humidity, 500 hours, alternating RH every 100 hours	No melting or disbondment
Outdoor Exposure Testing - Sacrificial		
Property	Test Method	Requirement
Sacrificial Coating removability	ASTM G7: 6 months exposure at FDOT test site	Complete removal of solvent based acrylic, polyurethane, and alkyd based spray paint from substrate