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**DIVISION 1800  
PAINT MATERIALS AND MIXED PAINTS**

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**1801 - INORGANIC ZINC PRIMER FOR STRUCTURAL STEEL**

**SECTION 1801**

**INORGANIC ZINC PRIMER FOR STRUCTURAL STEEL**

**1801.1 DESCRIPTION**

This specification covers inorganic zinc primer for use on structural steel.

**1801.2 REQUIREMENTS**

**a. General.**

(1) The coating is either a single component or multi-component type that cures without the use of a separate curing solution. It must be well ground, free of caking, skins, gelation and excessive settling with a shelf life for each component of no less than 12 months. Formulate the paint with a tint that provides distinct color contrast with the blast cleaned metal surfaces and the finish coat. The VOC content of the coating must comply with the EPA Federal Register 40 CFR, Part 59, Subpart D, Table 1 for industrial maintenance coatings.

(2) The manufacturer is responsible for the formulation. Once established, the formulation may not be changed without prior notification to and approval of the KDOT.

**b. Pigment.** Use a finely divided zinc powder as the pigment. Zinc dust must comply with ASTM D 520, Type II and contain no toxic heavy metals.

**c. Vehicle Component.** Use a liquid component consisting of partially hydrolyzed silicate with appropriate extenders and solvents.

**d. Mixed Paint.**

- (1) Zinc in the dried film, % by weight ..... 75 minimum
- (2) Cyclic Corrosion/UV Exposure Test, 15 cycles (one cycle = 2 weeks; one week of UV exposure and one week in the Cyclic Corrosion Tester.)
  - (a) Scribe Corrosion ..... 7 minimum
  - (b) Unscribed Area ..... 9 minimum

**e. Packaging.** Package the inorganic zinc primer such that when mixed according to the manufacturers instructions, a complete container of each component is utilized.

**1801.3 TEST METHODS**

**a. Zinc in the Dried Film.**

(1) Single Component Primer

Pigment ..... ASTM D 2371

Total Solids of the Whole Paint, Non-Volatile Zinc Oxide ..... ASTM D 2369

Calculations:

$ZnO \times 0.8034 = \text{Total Zinc}$

$(\% \text{ Pigment} \times \text{Total Zinc}) / \text{Total Solids} = \text{Zinc in Dried Film}$

(2) Multi-Component Primer

Total Solids of Liquid Portion, Non-Volatile Zinc Oxide ..... ASTM D 2369

The manufacturer will provide percent pigment by the mix ratio.

Calculations:

$ZnO \times 0.8034 = \text{Total Zinc}$

$(100 - \% \text{ Pigment})(\text{Non-volatile}) + \% \text{ Pigment} = \text{Total Solids}$

$(\% \text{ Pigment} \times \text{Total Zinc}) / \text{Total Solids} = \text{Zinc in Dried Film}$

**b. Cyclic Corrosion/UV Exposure** ..... ASTM D 5894 and  
KTMR-30

(1) Scribe Corrosion ..... ASTM D 1654

(2) Unscribed Area ..... ASTM D 1654

## 1801 - INORGANIC ZINC PRIMER FOR STRUCTURAL STEEL

### 1801.4 PREQUALIFICATION

a. Prequalification of the inorganic zinc primer is required. Manufacturers desiring prequalification should submit a 1 pint sample of each component to the Engineer of Tests. Manufacturers will be notified when testing is completed. The Bureau of Construction and Materials will maintain a list of prequalified materials.

b. Testing and evaluation by KDOT may be waived if complete testing has been performed on the identical product by AASHTO National Transportation Product Evaluation Program (NTPEP) or another state DOT. Forward an official copy of the test report along with evidence that the product referenced is identical to that submitted for prequalification, to the Engineer of Tests for evaluation.

c. All liquid components will be fingerprinted using infrared spectroscopy for use in screening future verification samples to ensure that materials submitted for use are of an identical formulation as originally approved.

### 1801.5 BASIS OF ACCEPTANCE

Prequalification as specified in **subsection 1801.4**.

Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

Visual observation of performance on the project.

1802 - ORGANIC ZINC PRIMER FOR STRUCTURAL STEEL

SECTION 1802

ORGANIC ZINC PRIMER FOR STRUCTURAL STEEL

1802.1 DESCRIPTION

This specification covers organic zinc primer for use on structural steel.

1802.2 REQUIREMENTS

a. General.

(1) The coating is either a single component or multi-component type that cures without the use of a separate curing solution. It must be well ground, free of caking, skins, gelation and excessive settling with a shelf life for each component of no less than 12 months. Formulate the paint with a tint that provides distinct color contrast with the blast cleaned metal surfaces and the finish coat. The VOC content of the coating must comply with the EPA Federal Register 40 CFR, Part 59, Subpart D, Table 1 for industrial maintenance coatings.

(2) The manufacturer is responsible for the formulation. Once established, the formulation may not be changed without prior notification to and approval of the KDOT.

b. Pigment. Use a finely divided zinc powder as the pigment. Pigments must contain no toxic heavy metals.

c. Mixed Paint.

- (1) Zinc in the dried film, % by weight ..... 77 minimum
(2) Cyclic Corrosion/UV Exposure Test, 15 cycles (one cycle = 2 weeks; one week of UV exposure and one week in the Cyclic Corrosion Tester.)
(a) Scribe Corrosion ..... 7 minimum
(b) Unscribed Area ..... 9 minimum

d. Packaging. Package the organic zinc primer such that when mixed according to the manufacturer's instructions, a complete container of each component is utilized.

1802.3 TEST METHODS

a. Zinc in the Dried Film.

- (1) Single Component Primer
Pigment ..... ASTM D 2371
Total Solids of the Whole Paint, Non-Volatile Zinc Oxide ..... ASTM D 2369

Calculations:
ZnO x 0.8034 = Total Zinc
(% Pigment x Total Zinc)/Total Solids = Zinc in Dried Film

- (2) Multi-Component Primer
Total Solids of Liquid Portion, Non-Volatile Zinc Oxide ..... ASTM D 2369

The manufacturer will provide percent pigment by the mix ratio.
Calculations:
ZnO x 0.8034 = Total Zinc
(100 - % Pigment)(Non-volatile) + % Pigment = Total Solids
(% Pigment x Total Zinc)/Total Solids = Zinc in Dried Film

- b. Cyclic Corrosion/UV Exposure ..... ASTM D 5894 and KTMR-30
(1) Scribe Corrosion ..... ASTM D 1654
(2) Unscribed Area ..... ASTM D 1654

## 1802 - ORGANIC ZINC PRIMER FOR STRUCTURAL STEEL

### 1802.4 PREQUALIFICATION

a. Prequalification of the organic zinc primer is required. Manufacturers desiring prequalification should submit a 1 pint sample of each component to the Engineer of Tests. Manufacturers will be notified when testing is completed. A list of prequalified materials will be maintained by the Bureau of Construction and Materials.

b. Testing and evaluation by KDOT may be waived if complete testing has been performed on the identical product by AASHTO National Transportation Product Evaluation Program (NTPEP) or another state DOT. Forward an official copy of the test report along with evidence that the product referenced is identical to that submitted for prequalification, to the Engineer of Tests for evaluation.

c. All liquid components will be “fingerprinted” using infrared spectroscopy for use in screening future verification samples to ensure that materials submitted for use are of an identical formulation as originally approved.

### 1802.5 BASIS OF ACCEPTANCE

Prequalification as specified in **subsection 1802.4**.

Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

Visual observation of performance on the project.

**1803 - ORGANIC ZINC RICH PAINT FOR REPAIRING  
DAMAGED SPELTER COATING**

**SECTION 1803**

**ORGANIC ZINC RICH PAINT FOR REPAIRING  
DAMAGED SPELTER COATING**

**1803.1 DESCRIPTION**

This specification covers organic zinc rich paint for use in repairing damaged spelter coating.

**1803.2 REQUIREMENTS**

Provide one-component organic zinc rich paint manufactured as a coating for steel and having a minimum of 85% zinc by weight in the dried film.

**1803.3 TEST METHODS**

None required.

**1803.4 PREQUALIFICATION**

None required.

**1803.5 BASIS OF ACCEPTANCE**

The basis of acceptance is visual inspection of the container label for compliance with these requirements.

**1804 - RESERVED**

**SECTION 1804**

**RESERVED**

**1805 - RESERVED**

**SECTION 1805**

**RESERVED**



**1806 - WATER-BORNE ACRYLIC FINISH COAT**

**SECTION 1806**

**WATER-BORNE ACRYLIC FINISH COAT**

**1806.1 DESCRIPTION**

This specification covers water-borne acrylic finish coat intended for use with organic and inorganic zinc primers and epoxy mastic primer on structural steel.

**1806.2 REQUIREMENTS**

**a. General.**

(1) The coating is a single component, water-borne acrylic formulated to display compatibility with and adhesion to the cured organic and inorganic zinc primers, acrylics and epoxy mastic primers. It is used as a protective color finish coat. The pigment must be finely ground, and the mixed paint must not be caked, gelled, skinned nor exhibit hard settling in the container. The coating cures to a tough, semi-gloss, abrasion resistant surface. The shelf life of this paint is no less than 24 months. The VOC content of the coating must comply with the EPA Federal Register 40 CFR, Part 59, Subpart D, Table 1 for industrial maintenance coatings.

(2) The manufacturer is responsible for the formulation. Once established, the formulation may not be changed without prior notification to and approval of the KDOT.

**b. Pigment.** Use titanium dioxide and color retentive tinting pigments and selected extender pigments.

**c. Paint.**

- (1) Total Solids, % by weight ..... 45 minimum
- (2) Cyclic Corrosion/UV Exposure Test, 15 cycles (one cycle = 2 weeks; one week of UV exposure and one week in the Cyclic Corrosion Tester.)
  - (a) Scribe Corrosion ..... 7 minimum
  - (b) Unscribed Area ..... 9 minimum

**1806.3 TEST METHODS**

- a. Total Solids** ..... ASTM D 1644, except that the procedure is modified to a dry time of 72 hours at 100°F rather than 3 hours at 221°F.
- b. Cyclic Corrosion /UV Exposure** ..... ASTM D 5894 and KTMR-30
  - (1) Scribe Corrosion ..... ASTM D 1654.
  - (2) Unscribed Area ..... ASTM D 1654.

**1806.4 PREQUALIFICATION**

**a.** Prequalification of the water-borne acrylic finish coat is required. Manufacturers desiring prequalification should submit a 1 pint sample to the Engineer of Tests. Manufacturers will be notified of results when testing is completed. A list of prequalified materials will be maintained by the Bureau of Construction and Materials.

**b.** Testing and evaluation by KDOT may be waived if complete testing has been performed on the identical product by AASHTO National Transportation Product Evaluation Program (NTPEP) or another state DOT. Forward an official copy of the test report along with evidence that the product referenced is identical to that submitted for prequalification, to the Engineer of Tests for evaluation.

## **1806 - WATER-BORNE ACRYLIC FINISH COAT**

c. All liquid components will be fingerprinted using infrared spectroscopy for use in screening future verification samples to verify that materials submitted for use are of an identical formulation as originally approved.

### **1806.5 BASIS OF ACCEPTANCE**

Prequalification as specified in **subsection 1806.4**.

Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

Visual observation of performance on the project.

# 1807 - MOISTURE-CURE URETHANE SYSTEM

## SECTION 1807

### MOISTURE-CURE URETHANE SYSTEM

#### 1807.1 DESCRIPTION

This specification covers a moisture-cure urethane micaceous iron oxide paint system for use on structural steel. The system may also be used for overcoating applications.

#### 1807.2 REQUIREMENTS

##### a. General.

(1) Each coating must be supplied as a single component material. All coatings must be well ground, free of caking, skins, gelation, and excessive settling with a shelf life of not less than 12 months. Pigmentation must contain no toxic heavy metals. The VOC content of the coatings must comply with the EPA Federal Register 40 CFR, Part 59, Subpart D, Table 1 for industrial maintenance coatings.

(2) All coatings must be able to be applied at relative humidity as high as 98% and temperatures as low as 20°F. There is no restriction on dewpoint temperature differential if the surface is visibly dry and free from condensate. Verify the surface to be free of any frozen water products when the application temperature is below 32°F.

(3) The manufacturer is responsible for the formulation. Once established, do not change the formulation without prior notification to and approval of the KDOT.

**b. Coating system for use on full removal and repaint projects or new construction projects.** This system consists of a zinc-rich, moisture-cure polyurethane primer stripe coat applied to all edges, corners, bolts, rivets, and weld seams; a zinc-rich, moisture-cure polyurethane full primer coat; and a micaceous iron oxide-filled, moisture-cure aliphatic polyurethane topcoat. The topcoat color will be specified on the Contract Documents. All micaceous iron oxide products must comply to ASTM D 5532, Type 1 and have a certificate of compliance.

(1) Stripe Primer and Full Primer:

- Total solids, % by weight ..... 87 minimum
- Zinc in the dried film, % by weight ..... 83 minimum

(2) Topcoat:

- Total solids, % by weight ..... 77 minimum
- Pigment, Micaceous Iron Oxide ..... 3 lb/gal minimum

(3) Paint System, Cyclic Corrosion/UV Exposure Test, 15 cycles (one cycle = 2 weeks; one week of UV exposure and one week in the Cyclic Corrosion Tester.):

- Scribe Corrosion ..... 7 minimum
- Unscribed Area ..... 8 minimum

**c. Coating system for use on overcoating projects.** This system consists of a zinc-rich/micaceous iron oxide-filled, moisture-cure polyurethane spot primer; a micaceous iron oxide-filled, moisture-cure polyurethane intermediate coat; and a micaceous iron oxide-filled, moisture-cure aliphatic polyurethane topcoat. The topcoat color will be specified in the Contract Documents. Comply all micaceous iron oxide products to ASTM D 5532, Type 1 and provide a certificate of compliance.

(1) Spot Primer:

- Total solids, % by weight ..... 86 minimum
- Pigment, Zinc dust & Micaceous Iron Oxide ..... 3.5 lb/gal minimum

(2) Intermediate Coat:

- Total solids, % by weight ..... 82 minimum
- Pigment, Micaceous Iron Oxide ..... 6 lb/gal minimum
- Color ..... Tint to distinguish from primer and topcoat

**1807 - MOISTURE-CURE URETHANE SYSTEM**

(3) Topcoat:

- Total solids, % by weight ..... 77 minimum
- Pigment, Micaceous Iron Oxide ..... 3 lb/gal minimum

(4) Paint System, Cyclic Corrosion/UV Exposure Test, 15 cycles (one cycle = 2 weeks; one week of UV exposure and one week in the Cyclic Corrosion Tester.):

- Scribe Corrosion ..... 7 - 10
- Unscribed Area ..... 8 - 10

**1807.3 TEST METHODS**

**a. Total Solids** ..... ASTM D 1644, except heat the sample for 72 hours at 100°F.

**b. Cyclic Corrosion/UV Exposure** ..... ASTM D 5894 and KTMR-30

- Scribe Corrosion ..... ASTM D 1654
- Unscribed Area ..... ASTM D 1654

**c. Zinc in the Dried Film.**

- Pigment ..... ASTM D 2371
- Total Solids of the Whole Paint, Non-Volatile ..... ASTM D 2369

Calculations:

$ZnO \times 0.8034 = \text{Total Zinc}$

$(\% \text{ Pigment} \times \text{Total Zinc}) / \text{Total Solids} = \text{Zinc in Dried Film}$

**1807.4 PREQUALIFICATION**

**a.** Prequalification of the moisture-cure urethane system is required. Manufacturers desiring prequalification should submit a 1 pint sample of each component to the Engineer of Tests. Manufacturers will be notified of results when testing is complete. The Bureau of Construction and Materials will maintain a list of prequalified materials.

**b.** All applicable liquid components will be fingerprinted using infrared spectroscopy for use in screening future verification samples to verify that materials submitted for use are of an identical formulation as originally approved.

**1807.5 BASIS OF ACCEPTANCE**

Prequalification as required by **subsection 1807.4.**

Receipt and approval of a Type C certification as specified in **DIVISION 2600.**

Visual observation of performance on the project.

**1808 – CALCIUM SULFATE ALKYD SYSTEM**

**SECTION 1808**

**CALCIUM SULFONATE ALKYD SYSTEM**

**1808.1 DESCRIPTION**

This specification covers a calcium sulfonate alkyd paint system for use on structural steel including weathering steel. The system may also be used for encapsulation or overcoating.

**1808.2 REQUIREMENTS**

**a. General.**

(1) The coating system consists of 3 materials: rust penetrating sealer, spot primer, and topcoat. The sealer is for use on pack rusted steel associated with and around rockers, riveted flanges and joints. The spot primer is for use where the existing coating has been removed. The topcoat is for use over existing paint, penetrating sealer, and spot primer. The coating can be used over a variety of existing paints including but not limited to lead based paint, inorganic/organic zinc, epoxy, vinyl, and alkyd. Supply each coating as a single component material. All coatings must be well ground, free of caking, skins, gelation, and excessive settling with a shelf life of not less than 12 months. Provide pigmentation that contains no toxic heavy metals. Comply with the current national rule for industrial maintenance coatings concerning VOC content.

(2) The manufacturer is responsible for the formulation. Once established, no change in the formulation is permitted without prior notification to and approval of the KDOT.

**b. Vehicle:** Use a modified overbased calcium sulfonate alkyd resin.

**c. Rust Penetrating Sealer:**

- Total solids, % by weight ..... 40 minimum

**d. Spot Primer:**

- Total solids, % by weight ..... 70 minimum

**e. Topcoat:**

- Total solids, % by weight ..... 70 minimum

**f. Paint System,**

- Cyclic Corrosion/UV Exposure Test, 15 cycles (one cycle = 2 weeks; one week of UV exposure and one week in the Cyclic Corrosion Tester.):
  - Scribe Corrosion ..... 7 minimum
  - Unscribed Area ..... 8 minimum

**1808.3 TEST METHODS**

**a. Total Solids** ..... ASTM D 1644, except heat the sample for 72 hours at 100°F.

**b. Cyclic Corrosion/UV Exposure** ..... ASTM D 5894 and KTMR-30

- Scribe Corrosion ..... ASTM D 1654
- Unscribed Area ..... ASTM D 1654

## 1808 – CALCIUM SULFATE ALKYD SYSTEM

### 1808.4 PREQUALIFICATION

a. Prequalification of the calcium sulfonate paint system is required. Manufacturers desiring prequalification should submit a 1-gallon sample to the Engineer of Tests. Manufacturers will be notified of results when testing is complete. The Bureau of Construction and Materials will maintain a list of prequalified materials.

b. Testing and evaluation by KDOT may be waived if complete testing has been performed on the identical product by AASHTO National Transportation Product Evaluation Program (NTPEP) or another state DOT. Forward an official copy of the test report along with evidence that the product referenced is identical to that submitted for prequalification, to the Engineer of Tests for evaluation.

c. All applicable liquid components will be fingerprinted using infrared spectroscopy for use in screening future verification samples to verify that materials submitted for use are of an identical formulation as originally approved.

### 1808.5 BASIS OF ACCEPTANCE

Prequalification as required by **subsection 1808.4**.

Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

Visual observation of performance on the project.