

TABLE OF CONTENTS

**DIVISION 1800
PAINT MATERIALS AND MIXED PAINTS**

SECTION	PAGE
1801 – INORGANIC ZINC PRIMER FOR STRUCTURAL STEEL.....	1800-1
1802 – ORGANIC ZINC PRIMER FOR STRUCTURAL STEEL.....	1800-3
1803 – ORGANIC ZINC RICH PAINT FOR REPAIRING DAMAGED SPELTER COATING	1800-5
1804 – ALUMINUM EPOXY MASTIC PRIMER.....	1800-6
1805 – HIGH-BUILD POLYURETHANE FINISH COAT	1800-8
1806 – WATER-BORNE ACRYLIC FINISH COAT	1800-10
1807 – MOISTURE-CURE URETHANE SYSTEM.....	1800-12
1808 – CALCIUM SULFONATE ALKYD SYSTEM.....	1800-14

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 current national rule 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, 3000 hours
 - (a) Scribe Corrosion 7 – 10
 - (b) Unscribed Area 9 - 10

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:

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

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

(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:

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

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

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

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 gallon sample to the Engineer of Tests. Manufacturers will be notified when testing is completed. The Bureau of Materials and Research 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 current national rule 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, 3000 hours
 - (a) Scribe Corrosion 7-10
 - (b) Unscribed Area 9-10

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:

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

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

(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:

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

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

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

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

- (1) Scribe Corrosion ASTM D 1654
- (2) Unscribed Area ASTM D 1654

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 gallon sample 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 Materials and Research.

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 - ALUMINUM EPOXY MASTIC PRIMER

SECTION 1804

ALUMINUM EPOXY MASTIC PRIMER

1804.1 DESCRIPTION

This specification covers aluminum epoxy mastic primer for use on structural steel.

1804.2 REQUIREMENTS

a. General.

(1) The coating is a self-priming, high solids, 2-component epoxy containing aluminum flake pigment. Design the aluminum epoxy mastic as a 1-coat high-build complete protective system with excellent adhesion to rusted steel, inorganic zinc and old paint after such surfaces have been properly prepared. The coating must be compatible with a wide variety of finish coats including urethanes and acrylics. Supply the epoxy coating as a 2-component material at a 1:1 volume mix ratio. It must be well ground, free of caking, skins, gelatin and excessive settling with a shelf life of each component of no less than 12 months. The VOC content of the coating must comply with the current national rule 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 leafing aluminum flake as the primary pigment. Other pigmentation must contain no toxic heavy metals.

c. Vehicle. Use a modified epoxy and curing agent that is suitably insensitive to moisture to allow trouble free application.

d. Mixed Paint.

- (1) Total Solids, % by weight 90 minimum
- (2) Cyclic Corrosion/UV Exposure Test, 2000 hours
 - (a) Scribe Corrosion 7 - 10
 - (b) Unscribed Area 9 - 10

e. Packaging. Package the aluminum epoxy mastic coating components in 2 containers such that when mixed according to the manufacturer's instructions, a complete container of each component is used.

1804.3 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
 - (1) Scribe Corrosion ASTM D 1654.
 - (2) Unscribed Area ASTM D 1654.

1804.4 PREQUALIFICATION

a. Prequalification of the aluminum epoxy mastic primer 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 completed. A list of prequalified materials will be maintained by the Bureau of Materials and Research.

1804 - ALUMINUM EPOXY MASTIC PRIMER

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 verify that materials submitted for use are of an identical formulation as originally approved.

1804.5 BASIS OF ACCEPTANCE

Prequalification as specified in **subsection 1804.4**.

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

Visual observation of performance on the project.

1805 - HIGH-BUILD POLYURETHANE FINISH COAT

SECTION 1805

HIGH-BUILD POLYURETHANE FINISH COAT

1805.1 DESCRIPTION

This specification covers high-build polyurethane finish coats intended for use with inorganic zinc and epoxy mastic primers on structural steel.

1805.2 REQUIREMENTS

a. General.

(1) The coating is a 2-component high build aliphatic polyurethane formulated to display compatibility with, and good adhesion to, cured inorganic zinc and epoxy mastic primers. It is used as a protective color finish coat. The coating cures to a hard, tough, abrasion resistant surface. It must be well ground, free of caking, skins, gelatin and excessive settling. The shelf life of each component must be no less than 12 months. The VOC content of the coating must comply with the current national rule 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. Mixed Paint.

- (1) Total Solids, % by weight 65 minimum
- (2) Cyclic Corrosion/UV Exposure Test, 2000 hours
 - (a) Scribe Corrosion 7 - 10
 - (b) Unscribed Area 9 - 10

c. Packaging. Package the high build polyurethane coating components in 2 containers such that, upon mixing one of each of the containers, the resulting paint is in the correct proportions for application.

1805.3 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
 - (1) Scribe Corrosion ASTM D 1654
 - (2) Unscribed Area ASTM D 1654

1805.4 PREQUALIFICATION

a. Prequalification of the high-build polyurethane finish coat 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 completed. A list of prequalified materials will be maintained by the Bureau of Materials and Research.

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 verify that materials submitted for use are of an identical formulation as originally approved.

1805 - HIGH-BUILD POLYURETHANE FINISH COAT

1805.5 BASIS OF ACCEPTANCE

Prequalification as specified in **subsection 1805.4**.

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

Visual observation of performance on the project.

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 current national rule 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, 2000 hours.
 - (a) Scribe Corrosion 7 - 10
 - (b) Unscribed Area 9 - 10

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-gallon 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 Materials and Research.

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 current national rule 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, 3000 hours:
 - Scribe Corrosion 7 - 10
 - Unscribed Area 8 - 10

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, 3000 hours:

- 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
 - Zinc Oxide Federal Test Method TT-P-141b, Method 709.1

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-gallon sample to the Engineer of Tests. Manufacturers will be notified of results when testing is complete. The Bureau of Materials and Research 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 SULFONATE 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, 3000 hours:
 - Scribe Corrosion 7 - 10
 - Unscribed Area 8 - 10

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 SULFONATE 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 Materials and Research 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.