



# Construction Specification AR-82 - Painting Metalwork

## 1. Scope

The work consists of cleaning metal surfaces and applying paints and protective coatings.

## 2. Paint

For the purpose of this specification, paints and coatings shall be designated by types as defined below.

Materials for systems requiring two or more coats shall be supplied by the same manufacturer.

Unless otherwise specified and before application, the contractor shall furnish in writing to the engineer for approval a plan outlining procedures proposed for painting metalwork and a list of material including name of manufacturer, pertinent product identification names and numbers, and product data sheets. Data shall reflect the requirements set forth in this section.

**Type 1 - Alkyd primer.** Alkyd based, rust inhibitive primer shall be lead and chromate free. Primer shall have a minimum of 54 percent solids, by volume. Color availability shall be red, gray, and white. Primer shall be able to be applied satisfactory at 2 to 3 mils dry-film thickness in one coat.

**Type 2 - Alkyd enamel (gloss).** Alkyd based enamel shall be lead free. It shall have a minimum of 49 percent solids, by volume. Alkyd enamel shall be able to be applied satisfactory at 2 to 3 mils dry-film thickness in one coat. Finish shall be gloss.

**Type 3 - Alkyd enamel (semigloss).** Alkyd based enamel shall be lead free. It shall have a minimum of 55 percent solids, by volume. Alkyd enamel shall be able to be applied satisfactory at 2 to 3 mils dry-film thickness in one coat. Finish shall be semigloss.

**Type 4 - Epoxy polyamide primer.** Epoxy polyamide primer shall be lead and chromate free. It shall have a minimum of 56 percent solids, by volume. Epoxy primer shall be able to be applied satisfactory at 4 to 6 mils dry-film thickness in one coat. Color availability shall be red, gray, and white. Epoxy primer shall conform to AWWA Standard C 210 and AWWA Standard D 102.

**Type 5 - Epoxy polyamide (intermediate or finish).** Epoxy polyamide shall be lead free. It shall have a minimum of 56 percent solids, by volume. Epoxy polyamide shall be able to be applied satisfactory at 4 to 6 mils dry-film thickness in one coat. Finish shall be semigloss. Epoxy finish shall conform to AWWA C 210 and AWWA D 102.

**Type 6 - Acrylic polyurethane (gloss).** Acrylic polyurethane shall be lead free. It shall have a minimum of 74 percent solids, by volume. Polyurethane shall be able to be applied satisfactory at 3 to 5 mils dry-film thickness in one coat. Finish shall be gloss.

**Type 7 - Acrylic polyurethane (semigloss).** Acrylic polyurethane shall be lead free. It shall have a minimum of 58 percent solids, by volume. Polyurethane shall be able to be applied satisfactory at 3 to 5 mils dry-film thickness in one coat. Finish shall be semigloss.



**Type 8 - Vinyl acid wash treatment.** Pretreatment primer for galvanized and nonferrous metal. Pretreatment primer shall have a minimum of 8 percent solids, by volume. The applied dry-film thickness of pretreatment primer shall not exceed 0.5 mil. Steel primed with pretreatment primer shall be topcoated within 6 to 8 hours in humid conditions.

**Type 9 - Single package moisture cured urethane primer.** Urethane primer shall have a minimum of 50 percent solids, by volume. Primer shall be able to be applied satisfactory at 2 to 3 mils dry-film thickness in one coat. Color shall be metallic aluminum.

**Type 10 - Coal tar epoxy.** Coal tar epoxy shall have a minimum of 75 percent solids, by volume, and conform to the requirements of NRCS Material Specification 583 Coal Tar Epoxy Paint (Steel Structures Paint Council PS No. 16, Type I). Coal tar epoxy shall be able to be applied satisfactory at 8 to 15 mils dry-film thickness in one coat.

### 3. Tinting

Tinting shall not be performed in the field unless otherwise specified.

### 4. Surface preparation

Surfaces to be painted shall be thoroughly cleaned before the application of paint or coatings. Surface preparations required by this specification are as designated by SSPC (Steel Structures Painting Council) and are summarized by the methods listed in this section.

**Method 1**—Near white blast (SSPC-SP10). All surfaces to be coated shall be prepared by removing all grease and oil using steam cleaning or solvent cleaning methods per method 5. After degreasing is completed, sand or grit blasting shall be performed to remove all dirt, rust, mill scale, and other foreign material or residue. The cleaned, finished surface shall be a minimum of 95 percent free of all visible foreign material or residue.

**Method 2**—Commercial blast (SSPC-SP6). All surfaces to be coated shall be prepared by removing all grease and oil using steam cleaning or solvent cleaning methods per method 5. After degreasing is completed, sand or grit blasting shall be performed to remove all dirt, rust, mill scale, or other foreign material or residue. The cleaned, finished surface shall be a minimum of 67 percent free of all visible foreign material or residue.

**Method 3**—Brush-off blast cleaning (SSPC-SP7). All surfaces to be coated shall be prepared by removing all grease and oil using steam cleaning or solvent cleaning methods per method 5. After degreasing is completed, sand or grit blasting shall be performed to remove dirt, rust, mill scale, or other foreign material or residue. Mill scale, rust, and paint are considered tightly adherent if they cannot be removed by lifting with a dull putty knife.

**Method 4**—Hand tool cleaning (SSPC-SP2). All surfaces to be coated shall be prepared by removing all oil or grease using steam cleaning or solvent cleaning methods per method 5. After degreasing is completed, non-power handtools shall be used to remove loose, detrimental foreign material. Adherent mill scale, rust, and paint need not be removed.



**Method 5**—Solvent cleaning (SSPC-SP1). Surfaces to be coated shall be prepared by removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from surfaces with solvents or commercial cleaners using various methods of cleaning, such as wiping, dipping, steam cleaning, or vapor degreasing.

## 5. Paint systems

For the purposes of this specification, systems of painting and coating metalwork are designated as defined in this section.

**Paint system A**—Consists of the application of one primer coat of type 1 and two or more coats of type 2 (gloss) or type 3 (semigloss) to provide a minimum dry-film thickness of 6 mils.

**Paint system B**—Consists of the application of one primer coat of type 9 and two or more coats of type 2 (gloss) or type 3 (semigloss) to provide a minimum dry-film thickness of 6 mils.

**Paint system C**—Consists of the application of one coat of type 4 and one or more coats of type 5 to provide a minimum dry-film thickness of 8 mils.

**Paint system D**—Consists of the application of one coat of type 4 primer, one coat of type 5, and one coat of type 6 (gloss) or type 7 (semigloss) to provide a minimum dry-film thickness of 11 mils.

**Paint system E**—Consists of the application of one coat of type 9 and one coat of type 6 (gloss) or type 7 (semigloss) to provide a minimum dry-film thickness of 5 mils.

**Paint system F**—Consists of the application of two coats of type 10 at a dry-film thickness of 8 mils. per coat. Total system shall provide a minimum dry-film thickness of 16 mils.

**Paint system G**—Consists of the application of two coats of type 4 and two coats of type 9 paint. Total system shall provide a minimum dry-film thickness of 14 mils.

## 6. Application of paint

Surfaces shall be painted immediately after preparation or within the same day as prepared with a minimum of one coat of the primer type specified. Remaining surfaces not required to be painted shall be protected against contamination and damage during the cleaning and painting operation.

Paints shall be thoroughly mixed immediately before application.

After erection or installation of the metalwork, all damage to shop-applied coating shall be repaired and all bolts, nuts, welds, and field rivet heads shall be cleaned and painted with one coat of the specified priming paint.

Initial priming coats shall be applied by brush except on surfaces accessible only to spray equipment. All other coats may be applied by brush or spray. Each coat shall be applied in such a manner to produce a paint film of uniform thickness with a rate of coverage within the guidelines and limits recommended by the paint manufacturer and as outlined in section 2 of this specification.

The drying time between coats shall be as prescribed by the paint manufacturer, but not less than that required for the paint film to thoroughly dry. The elapsed time between coats in paint system F shall not



exceed 24 hours. If for any reason the critical recoat time is exceeded, the coated surface shall be treated with the manufacturer's recommended tackifier solvent or brush blasted to roughen the surface.

The finished surface of each coat shall be free from runs, drops, ridges, laps, or excessive brushmarks and shall present no variation in color, texture, and finish. The surface of each dried coat shall be cleaned as necessary before application of the next coat.

## **7. Atmospheric conditions**

Paint application shall not be performed when the temperature of the item to be painted or the surrounding air is less than 50 degrees Fahrenheit. Painting shall be performed only when the humidity and temperature of the surrounding air and the temperature of the metal surfaces are such that evaporation rather than condensation results during the time required for application and drying. The surface shall be dry and a minimum of 5 degrees Fahrenheit above the dew point. Surfaces protected from adverse atmospheric conditions by special cover, heating, or ventilation shall remain so protected until the paint is thoroughly dry.

## **8. Tests**

Dry-film thickness on ferrous metal shall be determined by the use of a nondestructive magnetic instrument, such as an Elcometer or Mikrotest gauge. Instruments shall have been calibrated within 1 month before use. Film thickness on nonferrous metal shall be determined with film gauges during the application process. Systems with film thickness less than specified shall be brought into conformance by the application of one or more additional coats of the specified material.

## **9. Payment**

Compensation for any item of work described in the conservation plan, drawings, specifications, or contract, but not listed as a contract item, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 10 of this specification. No additional compensation will be made for subsidiary items.

## **10. Items of work and construction details**

Items of work to be performed in conformance with this specification and the construction details therefore are:

***Subsidiary Item*** - Application of protective coating(s) to newly fabricated or installed metalwork.

This item shall consist of surface preparation; the furnishing and applying of paint, or primer and paint in accordance with this specification and manufacturers recommendations. This item is subsidiary to Practice Standard(s): (430) Irrigation Pipeline, (587) Structure for Water Control, (410) Grade Stabilization Structure, (533) Pumping Plant, or as specified below.

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(Contract Item No.and Practice ; Construction Detail; other Specification)

Application of all coatings shall be in accordance with manufacturer's recommendations.

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**Section 4 – Surface preparation.** At a minimum all surfaces shall be prepared as recommended by the manufacturer. In the absence of detailed manufacturer’s recommendations the minimum surface preparation shall be by method 5. Any rust, mill scale, pain, or other foreign material that is not adherent (is flaky) as defined in method 3 shall be removed using method 4 or a more stringent method (lower number) of preparation. Surface preparation shall be by the more stringent of: minimums discussed above, Manufacturer’s Recommendations or specifications, in accordance with Plans and Drawings, method specified below:

Method \_\_\_\_\_

**Section 5 – Paint systems.** The system of painting and coating will be either Paint System: A, B, C, D, E, F, G, or as specified here \_\_\_\_\_.

Any paint or Paint System not shown not in this specification must be approved by a NRCS Engineer in writing prior to use.