

Section 13

PAINTING

13.1 GENERAL

13.1.1 Description

This work shall consist of the painting of surfaces shown on the plans or otherwise specified to be painted. The work includes, but is not limited to, the preparation of surfaces to be painted, application and curing of the paint, protection of the work, protection of existing facilities, vehicles and the public from damage due to this work, and the furnishing of all labor, equipment, and materials needed to perform the work.

13.1.2 Protection of Public and Property

The Contractor shall comply with all applicable environmental protection and occupational safety and health standards, rules, regulations, and orders. Failure to comply with these standards, rules, regulations, and orders will be sufficient cause for suspension or disqualification.

All reasonable precautions shall be taken to contain waste materials (used blasting material and old paint) classified as hazardous. Disposal of hazardous waste material shall be performed in accordance with all applicable federal, state, and local laws.

The Contractor shall provide protective devices such as tarps, screens or covers as necessary to prevent damage to the work and to other property or persons from all cleaning and painting operations.

Paint or paint stains that result in an unsightly appearance on surfaces not designated to be painted shall be removed or obliterated by the Contractor at own expense.

13.1.3 Protection of the Work

All painted surfaces that are marred or damaged as a result of operations of the Contractor shall be repaired by the Contractor, at own expense, with materials and to a condition equal to that of the coating specified herein.

If traffic causes an objectionable amount of dust, the Contractor, when directed by the Engineer, shall sprinkle

the adjacent roadbed and shoulders with water or dust palliative for a sufficient distance on each side of the location where painting is being done.

Upon completion of all painting operations and of any other work that would cause dust, grease, or other foreign materials to be deposited on the painted surfaces, the painted surfaces shall be thoroughly cleaned. At the time of opening structures to public traffic, the painting shall be completed, and the surfaces shall be undamaged and clean.

13.1.4 Color

If not otherwise shown or specified, the color of the top or finish coat of paint shall be as directed by the Engineer.

13.2 PAINTING METAL STRUCTURES

13.2.1 Coating Systems and Paints

The coating system and paints to be applied shall consist of the system in Table 13.2.1 which is specified for use or modified by the special provisions.

13.2.2 Weather Conditions

Paint shall be applied only on thoroughly dry surfaces. Painting will not be permitted when the atmospheric temperature, paint, or the surface to be painted is at or below 40°F or above 100°F, or when metal surfaces are less than 5°F above the dew point, or when the humidity exceeds 85% at the site of the work, or when freshly painted surfaces may become damaged by rain, fog, or dust, or when it can be anticipated that the atmospheric temperature will drop below 40°F during the drying period, except as provided herein for painting in enclosures. Metal surfaces which are hot enough to cause the paint to blister, to produce a porous paint film, or to cause the vehicle to separate from the pigment shall not be painted.

Subject to approval of the Engineer, the Contractor may provide a suitable enclosure to permit painting during inclement weather. Provisions shall be made to artifi-

TABLE 13.2.1

	High Pollution and Coastal	Mild Climate	Mild Climate or Maintenance Repainting
Primer	Inorganic Zinc—3 mils.	Organic Zinc—3 mils.	Oil/Alkyd—2 mils.
Intermediate Coat	Epoxy 2 mils or Vinyl Wash Primer 0.3-0.5 mils.	Epoxy 2 mils. or Vinyl Wash Primer 0.3-0.5 mils.	Oil/Alkyd—2 mils.
Top Coat	Epoxy, Vinyl, or Urethane—2 mils.	Epoxy, Vinyl, or Urethane—2 mils.	Oil/Alkyd—2 mils.
Total System	5.3-7 mils.	5.3-7 mils.	6 mils.

Notes:

- (1) Except for vinyl wash primer, the coating and system thicknesses shown are minimums.
- (2) Coating systems shown for severe areas are satisfactory in less severe areas.
- (3) Coastal—within 1,000 feet of ocean or tidal water. High Pollution—air pollution environment such as industrial areas. Mild—other than coastal area not in air pollution environment.
- (4) Inorganic zinc paint shall meet the requirements of Military Specification DOD-P-23236A (SH).
- (5) Organic zinc paint shall meet the requirements of Military Specification DOD-P-21035A.
- (6) Vinyl Wash Primer shall meet the requirements of Military Specification DOD-P-15328D.
- (7) Vinyl top coat paint shall meet the requirements of the Steel Structures Painting Council, SSPC-Paint 9.
- (8) Epoxy paint shall meet the requirements of the Steel Structures Painting Council, SSPC-22.
- (9) Oil/Alkyd primer and intermediate coat paint shall meet the requirements of the Steel Structures Painting Council, SSPC-Paint 25.
- (10) Oil/Alkyd top coat paint shall meet the requirements of the Steel Structures Painting Council, SSPC-Paint 104.
- (11) Urethane top coat paint shall meet the recommendations of the Steel Structures Painting Council, SSPC-PS Guide 1700.
- (12) Paints are hazardous because of their flammability and potential toxicity. Safe handling practices are required and should include, but not be limited to, the provisions of SSPC-PA Guide 3, "A Guide to Safety in Paint Application."

cially control atmospheric conditions inside the enclosure within limits suitable for painting throughout the painting operation. Surfaces painted under cover in damp or cold weather shall remain under cover until the paint dries or weather conditions permit open exposure. Full compensation for providing and maintaining such enclosures shall be considered as included in the prices paid for the various contract items of work involving painting and no additional compensation will be allowed therefore.

All blast cleaning, except that performed within closed buildings, and all painting shall be performed during daylight hours unless otherwise provided by the contract documents.

13.2.3 Surface Preparation

All exposed surfaces of structural steel, except galvanized or metalized surfaces, shall be cleaned and painted.

All surfaces of new structural steel shall be cleaned by the blast-cleaning method unless otherwise specified in the special provisions, or approved in writing by the Engineer.

In repainting existing steel structures the method of cleaning shall be as specified in the special provisions. Any damage to sound paint, on areas not designated for treatment, resulting from the Contractor's operations shall be repaired by the Contractor at own expense to the satisfaction of the Engineer.

The methods used in the cleaning of metal surfaces shall conform to the following.

13.2.3.1 Blast Cleaning

Abrasives used for blast cleaning shall be either clean dry sand, mineral grit, steel shot, or steel grit, at the option of the Contractor, and shall have a suitable grading to produce satisfactory results. The use of other abrasives will not be permitted unless approved in writing by the Engineer.

Unwashed beach sand containing salt or excessive amounts of silt will not be allowed.

All dirt, mill scale, rust, paint, and other foreign material shall be removed from exposed steel surfaces in accordance with the requirements of the Steel Structures Painting Council Surface Preparation Specification No. 10, SSPC-SP10—Near-White Blast Cleaning. Blast cleaning shall leave all surfaces with a dense and uniform anchor pattern of not less than 1 nor more than 3 mils. as measured with an approved surface profile comparator.

When blast cleaning is being performed near machinery, all journals, bearings, motors, and moving parts shall be sealed against entry of abrasive dust before blast cleaning begins.

Blast cleaned surfaces shall be primed or treated the same day blast cleaning is done, unless otherwise authorized by the Engineer. If cleaned surfaces rust or are con-

taminated with foreign material before painting is accomplished, they shall be reblast cleaned by the Contractor at own expense.

13.2.3.2 Steam Cleaning

All dirt, grease, loose chalky paint, or other foreign material which has accumulated on the previously painted or galvanized surfaces shall be removed with a steam cleaning apparatus which shall precede all other phases of cleaning. It is not intended that sound paint be removed by this process. Any paint which becomes loose, curled, lifted, or loses its bond with the preceding coat or coats after steam cleaning shall be removed as directed by the Engineer to sound paint or metal surface by the Contractor at own expense.

A biodegradable detergent shall be added to the feed water of the steam generator or applied to the surface to be cleaned. The detergent shall be of such composition and shall be added or applied in such quantity that the cleaning as described in the above paragraph is accomplished.

Any residue, detergent, or other foreign material which may accumulate on cleaned surfaces shall be removed by flushing with fresh water.

Steam cleaning shall not be performed more than 2 weeks prior to painting or other phases of cleaning.

Subsequent painting shall not be performed until the cleaned surfaces are thoroughly dry and in no case in less than 24 hours after cleaning and flushing.

13.2.3.3 Solvent Cleaning

Unless otherwise prohibited by the special provisions, solvents shall be used to remove oil, grease, and other soluble contaminants in accordance with the requirements of SSPC-SP1, Solvent Cleaning. Solvent cleaning shall be performed prior to blast cleaning. If contamination remains after blasting, the area shall be re-cleaned with solvent.

13.2.3.4 Hand Cleaning

Wire brushes, either hand or powered, hand scraping tools, power grinders, or sandpaper shall be used to remove all dirt, loose rust and mill scale, or paint which is not firmly bonded to the metal surfaces.

Pneumatic chipping hammers shall not be used unless authorized in writing by the Engineer.

13.2.4 Application of Paints

The Contractor shall notify the Engineer, in writing, at least 1 week in advance of the date that cleaning and painting operations are to begin.

Painting shall be done in a neat and workmanlike manner. Unless otherwise specified, paint shall be applied by brush, spray, or roller, or any combination thereof peculiar to the paint being applied.

Each application of paint shall be thoroughly cured and any skips, holidays, thin areas, or other deficiencies corrected before the succeeding application. The surface of the paint being covered shall be free from moisture, dust, grease, or any other deleterious materials that would prevent the bond of the succeeding applications. In spot painting, old paint which lifts after the first application shall be removed by scraping and the area repainted before the next application.

Paints specified are formulated ready for application and no thinning will be allowed unless otherwise provided in the applicable materials specification for the paint being used.

Brushes, when used, shall have sufficient body and length of bristle to spread the paint in a uniform film. Round, oval-shaped brushes, or flat brushes not wider than 4½ inches shall be used. Paint shall be evenly spread and thoroughly brushed out.

On all surfaces that are inaccessible for painting by regular means, the paint shall be applied by sheepskin daubers, bottle brushes, or by any other means approved by the Engineer.

Rollers, when used, shall be of a type that do not leave a stippled texture in the paint film. Rollers shall be used only on flat, even surfaces to produce a paint film of even thickness with no skips, runs, sags, or thin areas.

Paint may be applied with airless or conventional spray equipment.

Suitable traps or separators acceptable to the Engineer shall be furnished and installed in the airline to each spray pot to exclude oil and water from the air.

Any spray method which produces excessive paint build-up, runs, sags, or thin areas in the paint film, or skips and holidays, will be considered unsatisfactory and the Engineer may require modification of the spray method or prohibit its use and require brushing instead.

Mechanical mixers shall be used to mix paint. Prior to application, paint shall be mixed a sufficient length of time to thoroughly mix the pigment and vehicle together, and shall be kept thoroughly mixed during its application.

The dry film thickness of the paint will be measured in place with a calibrated magnetic film thickness gage according to Steel Structures Painting Council SSPC-PA2.

The thickness of each application shall be limited to that which will result in uniform drying throughout the paint film.

Succeeding applications of paint shall be of such shade as to contrast with the paint being covered.

Structures shall be blast cleaned and painted with the total thickness of undercoats before erection. After erection and before applying subsequent paint, all areas where paint has been damaged or has deteriorated and all exposed unpainted surfaces shall be thoroughly cleaned and spot painted with the specified undercoats to the specified thickness.

Surfaces exposed to the atmosphere and which would be inaccessible for painting after erection shall be painted the full number of applications prior to erection.

Vinyl wash primer, if required, shall not be applied more than 12 hours before application of the succeeding coat of paint. The vinyl wash primer shall be applied by spraying to produce a uniform wet film on the surface. The dry film thickness shall be between 0.3 and 0.5 mils.

The painting of areas under joint connection and splice plates shall conform to Article 11.5.6.3.

13.2.4.1 Application of Zinc-Rich Primers

Zinc-rich primers, which include organic and inorganic zinc primers, shall be applied by spray methods. On areas inaccessible to spray application, the paint may be applied by brush or daubers.

Mechanical mixers shall be used in mixing the primer. After mixing, zinc-rich primers shall be strained through a metal 30-60 mesh screen or a double layer of cheesecloth immediately prior to or during pouring into the spray pot.

An agitating spray pot shall be used in all spray application of zinc-rich primers. The agitator or stirring rod shall reach to within 2 inches of the bottom of the spray pot and shall be in motion at all times during primer application. Such motion shall be sufficient to keep the primer well mixed.

Spray equipment shall provide the proper pot pressure and atomization pressure to produce a coating the composition of which shall comply in all respects to the specifications for zinc paint. The hose from pot to nozzle shall not be more than 75 feet long, nor be used more than 15 feet above or below the pot.

Cured, zinc-rich primer shall be free from dust, dirt, salt, or other deleterious deposits and thoroughly dry before applying vinyl wash primer.

In addition, the application of inorganic zinc paints shall conform to the following paragraphs.

Succeeding applications of inorganic zinc paints shall be applied within 24 hours, but not less than 30 minutes after prior application of such paint.

In areas where mud-cracking occurs in the inorganic zinc paint, it shall be blast cleaned back to soundly bonded paint, and recoated to the same thickness by the same methods specified for the original coat.

Paint shall be cured for 48 hours at a relative humidity of at least 45% before the application of vinyl wash primer. The cured inorganic zinc paint shall be hosed down with water and be in a surface dry condition before the application of vinyl wash primer if the vinyl wash primer is not applied within 3 weeks after the inorganic zinc paint is applied, or when there is evidence of dust, dirt, salt, or other deleterious deposits on the inorganic zinc paint.

13.2.5 Measurement and Payment

Cleaning and painting structural steel will be paid for on the basis of lump sum prices, unless otherwise specified in the special provisions.

The lump sum prices paid for clean structural steel and for paint structural steel or the lump sum price paid for clean and paint structural steel shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in cleaning and painting structural steel as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.

13.3 PAINTING GALVANIZED SURFACES

All galvanized surfaces that are to be painted shall first be cleaned by washing with mineral spirit solvent sufficient to remove any oil, grease, or other materials foreign to the galvanized coating.

After cleaning, vinyl wash primer shall be applied to such surfaces. The vinyl wash primer shall be applied by spraying to produce a uniform wet film on the surface. The dry film thickness shall be between 0.3 and 0.5 mils.

Finish paint to be applied to primed galvanized surfaces shall be as shown on the plans or otherwise specified. If not shown or otherwise specified, the finish paint shall be the same as that used on adjacent metal work or shall be as directed by the Engineer.

No separate payment will be made for preparing and painting galvanized surfaces and full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in preparing and painting galvanized surfaces as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer will be considered as included in the prices paid for the various contract items of work involving the galvanized surfaces.

13.4 PAINTING TIMBER

13.4.1 General

Unless otherwise shown on the plans or specified in the special provisions, all new timber requiring painting shall be painted with three applications of paint. The paint used for various applications will be as specified in these specifications or as shown on the plans or specified in the special provisions.

The painting of previously painted surfaces shall be as required by the plans and specifications.

13.4.2 Preparation of Surfaces

All cracked or peeled paint, loose chalky paint, dirt and other foreign material shall be removed by wire brushing, scraping or other means immediately prior to painting. The moisture content of the timber shall not be more than 20% at the time of the first application.

13.4.3 Paint

Paint for timber structures, except as otherwise provided herein, shall conform to the Specification for White and Tinted Ready-Mixed Paint, AASHTO M 70. The paint as specified is intended for use in covering previously painted surfaces. When it is applied to unpainted timber, turpentine and linseed oil shall be added as required by the character of the surface in an amount not to exceed 1 pint per gallon of the paint as specified. The paint shall be either white or tinted as directed by the Engineer.

If a black finish paint is specified, the first or prime coat shall be as specified above. Black paint shall conform to the Specifications for Black Paint, AASHTO M 68.

13.4.4 Application

When permitted in writing by the Engineer, the first application of paint may be applied prior to erection.

After the first application has dried and the timber is in place, all cracks, checks, nail holes, or other depressions shall be puttied flush with the surface and allowed to dry before the second application of paint.

Paint shall be applied by brush, air spray, or roller, spread evenly, and worked thoroughly into all seasoning cracks, corners, and recesses. No later coat shall be applied until the full thickness of the previous coat has dried.

Final brush strokes with aluminum paint shall be made in the same direction to ensure that powder particles "leaf" evenly.

13.4.5 Painting Treated Timber

Timber treated with creosote or oil-borne, pentachlorophenol preservatives shall normally not be painted.

Timber treated with water-borne preservatives shall be clean and be reduced to no more than 20% moisture content before it is painted. Any visible salt crystals on the wood surface shall be washed and brushed away, and the moisture content reduced again to the specified level before painting. Stored timber awaiting painting shall be covered and stacked with spreaders to ensure air circulation.

13.4.6 Payment

No separate payment will be made for preparing surfaces and for painting new timber. The painting of existing timber will be paid for on the basis of lump sum prices. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in preparing surfaces and painting timber as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer will be considered as included in the prices paid for the various contract items of work involving new timber or the prices paid for painting existing timber.

13.5 PAINTING CONCRETE

13.5.1 Surface Preparation

Prior to painting concrete surfaces, laitance and curing compounds shall be removed from the surface by abrasive blast cleaning in accordance with Article 13.2.3.1.

Concrete surfaces shall be thoroughly dry and free of dust at the time the paint is to be applied.

Any artificial drying procedures and methods shall be subject to approval by the Engineer.

13.5.2 Paint

Unless otherwise specified in the special provisions, paint to be applied to concrete surfaces shall be acrylic emulsion and shall comply in all respects to Federal Specification TT-P-19 (latest revision), Paint, Acrylic Emulsion, Exterior. This paint may be tinted by using "universal" or "all purpose" concentrates.

13.5.3 Application

Acrylic emulsion paint shall be applied in not less than two applications to produce a uniform appearance.

The paint shall be applied only when the ambient temperature is 50°F, or above. Painting will not be permitted when it can be anticipated that the ambient temperature will drop below 50°F during the application and drying of the paint.

13.5.4 Measurement and Payment

Preparing and painting concrete will be measured either by the lump sum or by the square foot as listed in the

schedule of bid items. When measured by the square foot, measurement will be determined along the surface of the actual area painted.

The contract price paid per lump sum or square foot for prepare-and-paint concrete shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in preparing the concrete and applying the paint to concrete surfaces, as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.