

SECTION 9D

PAINTING, GENERAL

1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 Federal Specifications (Fed. Spec.):

P-W-155C & Int. Am-1	Wax, Floor, Water-Emulsion
TT-C-535B & Am-2	Coating, Epoxy, Two Component, for Interior Use on Metal, Wood, Wallboard, Painted Surfaces, Concrete and Masonry
TT-C-555B & Am-1	Coating, Textured (for Interior and Exterior Masonry Surfaces)
TT-E-489G	Enamel, Alkyd, Gloss (for Exterior and Interior Surfaces)
TT-E-508C	Enamel, Interior, Semigloss, Tints and White
TT-E-509b & Am-2	Enamel, Odorless, Alkyd, Interior, Semigloss, White and Tints
TT-E-543a & Am-1	Enamel, Interior, Undercoat, Tints and White
TT-E-545B & Am-1	Enamel, Odorless, Alkyd, Interior-Undercoat, Flat, Tints and White
TT-E-1593B	Enamel, Silicone Alkyd Copolymer, Gloss (for Exterior and Interior Use)
TT-F-1098D	Filler, Block, Solvent-Thinned, for Porous Surfaces (Concrete Block, Cinder Block, Stucco, Etc.)
TT-P-19C & Am-2	Paint, Acrylic Emulsion: Exterior
TT-P-29J & Am-1	Paint, Latex Base, Interior, Flat, White and Tints
TT-P-31D	Paint, Oil: Iron-Oxide, Ready-Mixed, Red and Brown
TT-P-37D & Am-4	Paint, Alkyd Resin; Exterior Trim, Deep Colors

TT-P-38D & Am-1	Paint, Aluminum, Ready-Mixed
TT-P-55b & Am-2	Paint, Polyvinyl Acetate Emulsion, Exterior
TT-P-86G	Paint, Red-Lead-Base, Ready-Mixed
TT-P-102E	Paint, Oil Alkyd Modified, Exterior, Whites and Tints
TT-P-615d & Am-3	Primer Coating: Basic Lead Silico Chromate, Ready Mixed
TT-P-641G & Am-1	Primer Coating; Zinc Dust-Zinc Oxide (for Galvanized Surfaces)
TT-P-645A	Primer, Paint, Zinc-Chromate, Alkyd Type
TT-P-650C & Am-1	Primer Coating, Latex Base, Interior, White (for Gypsum Wallboard)
TT-P-1181a & Am-1	Paint, Styrene-Acrylate Solvent Type, Tints and Deep Tones (for Exterior Masonry)
TT-P-1511B	Paint, Latex (Gloss and Semigloss, Tints and White) (for Interior Use)

1.2 Federal Standard (Fed. Std.):

No. 595a & Change Notices 1, 2, 3, 4, 5, & 6	Colors
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1.3 Military Specifications (Mil. Spec.):

DOD-P-15328D	Primer (Wash), Pretreatment (Formula No. 117 for Metals) (Metric)
MIL-P-26915B	Primer Coating, Zinc Dust Pigmented, for Steel Surfaces

1.4 Military Standard (Mil. Std.):

MIL-STD-101B	Color Code for Pipelines and for Compressed Gas Cylinders
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1.5 American Society for Testing and Materials (ASTM) Publication:

C 150-82	Portland Cement
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1.6 Steel Structures Painting Council (SSPC) Specification:

SSPC-PA 1-82	Shop, Field, and Maintenance Painting
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2. DEFINITION: The term "paint" as used herein, includes emulsions, enamels, paints, stains, sealers, cement-emulsion filler, and other coatings, whether used as prime, intermediate, or finish coats.

3. PACKAGING, LABELING, AND STORAGE: Paints shall be in sealed containers that legibly show the designated name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paint shall be stored on the project site or segregated at the source of supply sufficiently in advance of need to allow 30 days for testing. Emulsion paints shall be stored to prevent freezing.

4. SUBMITTALS:

4.1 Certificates of Compliance: Except for lead-based metal primers for use in concealed spaces, the Contractor shall furnish a certificate of compliance in accordance with the SPECIAL PROVISIONS attesting that all paints proposed for use contain not more than 0.06 percent lead as defined in paragraph HAZARDOUS MATERIALS RESTRICTIONS.

4.2 Manufacturer's Instructions: Detailed mixing, thinning and application instructions, minimum and maximum application temperature, and curing time and drying time between coats shall be furnished for epoxy coatings.

4.3 Samples: Upon notification by the Contractor that the material is at the site or source of supply, a 1-quart sample of each batch, except for small quantities approved as proprietary brands, shall be taken by random selection from the sealed containers by the Contractor in the presence of a representative of the Contracting Officer. The contents of the sampled containers shall be thoroughly mixed to render the sample representative. Samples shall be identified by designated name, specification number, batch number, project contract number, intended use, and quantity involved.

4.4 Small Quantity Substitution: The Contractor shall submit for approval the names of the proprietary brands of materials that are proposed to be substituted for the specified materials when the required quantity of a particular color is 25 gallons or less.

4.5 Test Reports: The Contractor shall furnish either one of the following reports for batches in excess of 25 gallons:

a. A test report showing that the batch meets all specification requirements.

b. A test report showing that a previous batch of the same formulation as the batch to be used met all specification requirements, and a report of test results for properties of weight per gallon, viscosity, fineness of grind, drying time, color, and gloss.

5. COLORS AND TINTS: Colors and tints shall conform to Fed. Std. 595 and shall be as listed on the drawings. Stains shall conform in shade to manufacturer's standard color. The color of the undercoats shall vary slightly from the color of the next coat.

6. QUALITY ASSURANCE PROVISIONS: Materials will be approved based on test reports furnished, except where samples are tested, approval will be based on tests of samples. If materials are approved based on test reports furnished, samples will be retained by the Government for testing should the materials appear defective during or after application. In addition to any other remedies under the contract, the actual cost of retesting materials found to be defective will be deducted from payments due the Contractor.

7. ENVIRONMENTAL CONDITIONS: Unless otherwise recommended by the paint manufacturer, the ambient temperature shall be between 45 and 95 degrees F. when applying coatings other than water-thinned, epoxy coatings. Water-thinned coatings will only be applied when ambient temperature is between 50 and 90 degrees F. Epoxy coatings will only be applied within the minimum and maximum temperature recommended by the coating manufacturer. Paints, except water-thinned types, shall be applied only to surfaces that are completely free of surface moisture as determined by sight or touch. In no case shall paint be applied to surfaces upon which there is visible frost or ice.

8. MATERIALS:

8.1 General: Materials shall conform to the requirements of the specifications listed herein and in the PAINTING SCHEDULE except when the required quantity of a material of a particular color is 25 gallons or less, an approved proprietary brand of materials similar in intended usage and color to that specified may be used.

8.2 Cement-Emulsion Fill Coat: Fill coat shall be either an acrylic-base fill coat or a polyvinyl acetate fill coat and shall consist of the following:

White Portland Cement	16.5 pounds
Aggregate	33.5 pounds
Mixing Liquid	0.75 gallon
Potable Water	1.0 gallon maximum
Exterior Emulsion Paint	1.0 gallon

The white portland cement shall conform to ASTM C 150, Type I. The aggregate shall be washed silica sand with the following gradation:

<u>U.S. Sieve Size</u>	<u>Percent Sand (by Weight) Passing Individual Sieve</u>
20	100
30	95 - 100
50	30 - 65
100	0 - 10
200	0 - 1

The mixing liquid shall be the same resin emulsion as used in formulating the exterior emulsion paint. The acrylic mixing liquid shall contain 46 to 47 percent solids. The polyvinyl acetate mixing liquid shall consist of 92.6 percent by weight of vinyl polymer (55 percent solids), 3.7 percent by weight carbitol acetate, and 3.7 percent by weight potable water. The

mixing liquid shall be factory prepared. The exterior emulsion paint shall be exterior acrylic emulsion paint conforming to Fed. Spec. TT-P-19 or exterior polyvinyl acetate emulsion paint conforming to Fed. Spec. TT-P-55, Type II. The various cement-emulsion fill coats and exterior emulsion paints shall not be interchanged.

8.3 Exterior Oil Paint: Exterior oil paint shall conform to the following Federal Specifications.

White: TT-P-102, Type I.

Light Tints: TT-P-102, Type II.

Red or Brown: TT-P-31.

Other Deep Colors: TT-P-37.

8.4 Ferrous-Metal Primer: Ferrous-metal primer shall conform to Fed. Spec. TT-P-86, Type I or II; Fed. Spec. TT-P-615, Type I, II, or V; or Fed. Spec. TT-P-645.

8.5 Fungicide: Material specified for all coats applied to fabrics and vapor barrier jackets over insulation shall contain a fungicide that will not adversely affect the color, texture, or durability of the coating. The paint shall contain a fungicide incorporated into the paint by the manufacturer and will meet the fungus resistance test specified in Fed. Spec. TT-P-19.

8.6 Concrete Stain: Concrete stain shall be one of the following products: Kemiko Concrete Stain, Scofield Lithichrome Chem Stain, or an approved equal.

9. HAZARDOUS MATERIALS RESTRICTIONS:

9.1 Lead: Paint shall contain not more than 0.06 percent lead by weight (calculated as lead metal) in the total nonvolatile content of the paint except lead-based metal primers as hereinbefore specified may be used in concealed spaces.

9.2 Mercury: Mercurial fungicides shall not be used in exterior oil paints.

10. SURFACE PREPARATION:

10.1 General: Items not to be painted which are in contact with or adjacent to painted surfaces shall be removed or protected prior to surface preparation and painting operations. Exposed ferrous metals including nails on or in contact with surfaces to be painted with water-thinned paints shall be spot-primed with zinc dust, zinc dust-zinc oxide, zinc yellow-iron oxide, or zinc chromate primer. Surfaces to be painted shall be clean before applying paint or surface treatments. Oil and grease shall be removed with clean cloths and cleaning solvents prior to mechanical cleaning. Cleaning solvents shall be of low toxicity with a flashpoint in excess of 100 degrees F. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces.

10.2 Concrete and Masonry Surfaces: Surfaces shall be allowed to dry at least 30 days before painting or 45 days before staining. Glaze, efflorescence, laitance, dirt, grease, oil, asphalt, surface deposits of free iron and other foreign matter shall be removed prior to painting. Immediately before coating with cement-emulsion filler, concrete-masonry-unit surfaces to be painted shall be uniformly and thoroughly dampened, with no free surface water visible, by several applications of potable water with a fog spray, allowing time between the sprayings for water to be absorbed. Concrete surfaces to be painted with epoxy coatings shall be acid etched with 10 percent aqueous solution of muriatic acid, thoroughly rinsed with water and dried. The dry concrete surface shall then be treated with the manufacturer's recommended conditioner prior to application of the first coat. Concrete floor to receive stain shall be finished as hereinbefore specified except they shall not be cleaned with acid.

10.3 Ferrous Surfaces: Ferrous surfaces that have not been shop-coated shall be solvent-cleaned. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be mechanically cleaned by power wire brushing or sandblasting. Minor amounts of residual rust, that cannot be removed except by thorough blast-cleaning, and tight mill scale that cannot be removed by applying a sharp knife to any edge, will be allowed to remain. After cleaning, one coat of ferrous-metal primer shall be applied to all ferrous surfaces to receive paint other than asphalt varnish and vinyl paint. The semitransparent film applied to some pipes and tubing at the mill is not to be considered as a shop coat, but shall be overcoated with the specified ferrous metal primer prior to application of finish coats. Shop coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

10.4 Galvanized and Non-Ferrous Surfaces: Galvanized, aluminum and aluminum-alloy, lead, copper and other non-ferrous surfaces to be painted shall be solvent-cleaned and treated with vinyl-type wash coat.

10.5 Gypsum Board Surfaces: Gypsum board surfaces shall be dry and shall have all loose dirt and dust removed by brushing with a soft brush or rubbing with a dry cloth prior to application of the first coat material.

10.6 Mastic-Type Surfaces: Mastic-type surfaces shall be prepared by removing foreign material.

11. MIXING AND THINNING:

11.1 General: Packaged paint other than cement-emulsion filler may be thinned immediately prior to application where necessary to suit conditions of surface, temperature, weather, and method of application with not more than 1 pint of suitable thinner per gallon. The use of thinner shall not relieve the Contractor from obtaining complete hiding. Paints of different manufacturers shall not be mixed.

11.2 Cement-Emulsion Fill Coat: Cement and aggregate shall be dry mixed so that uniform distribution and intermixing are obtained. Mixing liquid and one-half of the total amount of water shall be premixed and added gradually to the white portland cement and aggregate with constant stirring

until a thick, smooth material is obtained. Emulsion paint shall then be added to the foregoing and stirred until uniformity is obtained. The blend shall have a thick, creamy consistency. The remainder of the water shall be added if necessary, to obtain a material with adequate application characteristics. Blending resin emulsion or emulsion paint with any other component shall be done with caution; too rapid agitation will cause air entrapment and foaming.

11.3 Epoxy Coatings: Mixing of two component systems shall be in strict accordance with manufacturer's instructions. Thinning, if any, of the first coat to insure proper penetration and sealing will be as recommended by the manufacturer for each type of substrate.

11.4 Vinyl-Type Wash Coat: Mil. Spec. DOD-P-15328 wash coat shall be mixed by adding one volume of acid component to four volumes of resin component. The acid component shall be added slowly to the resin component with constant stirring. The wash coat shall be used within 8 hours. The material may be reduced with normal butyl alcohol or 99 percent isopropyl alcohol, if thinning is required to maintain a wet spray.

12. APPLICATION:

12.1 General: Paint may be applied by brush, roller or spray except as hereinafter specified. At time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application. Paint shall be applied so finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. Each coat shall be applied as a film of uniform thickness. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated. Special attention shall be given to insure that all surfaces including edges, corners, crevices, welds, and rivets receive a film thickness equivalent to that of adjacent painted surfaces. Adequate ventilation shall be provided during paint application. Respirators shall be worn by all persons engaged in spray painting. Adjacent areas shall be protected by the use of drop cloths or other approved precautionary measures shall be taken. The first coat on gypsum wallboard and other surfaces shall include repeated touching up of suction spots or overall applications of primer or sealer to produce a uniform color and gloss. Paints shall be applied only to surfaces that are completely free of surface moisture as determined by sight or touch. In no case shall paint be applied to surfaces upon which there is visible frost or snow. Floor sealer coat shall be given additional touchup coats necessary to eliminate dull spots. Excess sealer shall be wiped off after each application.

12.2 Coating Progress: Sufficient time shall elapse between successive coats to permit proper drying. This period shall be modified as necessary to suit adverse weather conditions. Oil base or oleoresinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

12.3 Epoxy Coatings: Manufacturer's instructions for application, curing and drying time between coats will be followed. Second coat will be applied at a maximum spreading rate of 450 square feet per gallon.

12.4 Masonry Surfaces: Masonry surfaces may be coated by brush, roller, or spray, except filler coats. Cement-emulsion filler shall be vigorously scrubbed into the surface with a stiff-bristle brush having tampico or palmyra bristles not longer than 2-1/2 inches. At least 24 hours shall elapse before applying exterior emulsion paint over cement-emulsion filler coat. When the ambient temperature is in excess of 85 degrees F., cement-emulsion filler surfaces shall be lightly dampened with a fog spray of potable water immediately prior to application of the subsequent paint coat. Solvent-thinned filler shall be applied to thoroughly dry surfaces by brush, allowed to set for 3 to 5 minutes or until the filler becomes tacky, and the excess filler material removed with a rubber squeegee. Surface voids shall be filled. Surface irregularities need not be completely filled. The material shall not be applied over calking compound.

12.5 Metal Surfaces: First coats other than vinyl paints or vinyl-type wash coats shall be applied by brush. The three coat paint systems specified for exterior and interior ferrous surfaces shall be applied so that the dry film thickness of the three coat systems at any point shall be not less than 4.0 mils with the primer having a minimum dry film thickness of 1.5 mils. Vinyl paint system for exterior ferrous surfaces subject to severe atmospheric exposures shall be applied in accordance with applicable provisions of SSPC-PA 1. The dry film thickness of the four coat system at any point shall be not less than 4.5 mils with the primer having a minimum dry film thickness of 1.2 mils.

12.6 Time Between Surface Preparation and Painting: Surfaces that have been cleaned, pretreated and otherwise prepared for painting shall be given a coat of the specified first coat as soon as practicable after such pretreatment has been completed, but prior to any deterioration of the prepared surface.

12.7 Vinyl-Type Wash Coat: Vinyl-type wash coat shall be applied by brush or spray at a spreading rate of 250 to 300 square feet per gallon to give dry-film thickness of 0.3 mil to 0.5 mil. A wet spray shall be maintained at all times. Surfaces shall be permitted to dry for 1 hour and shall be coated as soon as practicable within 24 hours and prior to any deterioration or accumulation of dust or dirt.

13. MISCELLANEOUS: Color code marking for piping systems shall be in accordance with Mil. Std. MIL-STD-101. Markings shall be color pressure-sensitive adhesive tape and flexible pipe markers or paint. Paint shall be as specified for insulated and uninsulated piping.

14. SURFACES TO BE PAINTED: Surfaces listed in the PAINTING SCHEDULE, other than those listed in paragraphs SURFACES NOT REQUIRING PAINTING and

SURFACES FOR WHICH PAINTING IS PROHIBITED, will receive the surface preparation, paints, and number of coats prescribed in the schedule.

15. SURFACES NOT REQUIRING PAINTING: The following listed items will not require painting:

- a. Concrete blast walls, except in support areas.
- b. Precast concrete.

16. SURFACES FOR WHICH PAINTING IS PROHIBITED: The following listed items shall not be painted:

- a. Acrylic glazing.
- b. Sprinkler heads.
- c. Fire detection elements.
- d. Deluge valves.

17. CLEANING: Cloths, cotton waste and other debris that might constitute a fire hazard shall be placed in closed metal containers and removed at the end of each day. Upon completion of the work, staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint and other deposits upon adjacent surfaces shall be removed and the entire job left clean and acceptable.

18. PAINTING SCHEDULE: The PAINTING SCHEDULE prescribes the surfaces to be painted, required surface preparation, and the number and types of coats of paint. Explanatory information for use with the PAINTING SCHEDULE is as follows:

18.1 Contractor's Options: The PAINTING SCHEDULE provides two types of Contractors options as shown in the following examples.

<u>Surface</u>	<u>1st Coat</u>	<u>2nd Coat</u>	<u>3rd Coat</u>
(1) Exterior wood surfaces not otherwise specified	TT-P-1984	TT-P-19 TT-P-1510	TT-P-19 or TT-P-1510
(2) Interior hardboard surfaces	TT-E-543 or TT-E-545	TT-E-508 or TT-E-509	

Explanation: In the first example, the Contractor must use Fed. Spec. TT-P-1984 for the first coat. The Contractor has the option of using Fed. Spec. TT-P-19 or Fed. Spec. TT-P-1510 for the 2nd and 3rd coats. The Contractor shall not mix this option by using Fed. Spec. TT-P-19 for one coat and Fed. Spec. TT-P-1510 for the other coat. In the second example,

the Contractor has the option of using either Fed. Spec. TT-E-543 or Fed. Spec. TT-E-545 for the first coat, and either Fed. Spec. TT-E-508 or Fed. Spec. TT-E-509 for the second coat, in any of the four possible combinations.

18.2 Shop-Painted Items: Surfaces of items finish-painted by the manufacturer, or specified to be finish-painted under other sections of the specifications, are exempted from the requirements for surface preparation and painting. Shop-primed items shall receive surface preparation and finish painting as required by this section.

18.3 Surface Preparation: The statement "as previously specified" under column heading "Surface Preparation" of the PAINTING SCHEDULE refers to paragraph SURFACE PREPARATION of this section of the specification.

PAINTING SCHEDULE

<u>Surface</u>	<u>Surface Preparation</u>	<u>1st Coat</u>	<u>2nd Coat</u>	<u>3rd Coat</u>
Exterior ferrous surfaces, exposed, unless otherwise specified	As previously specified	Exterior oil paint	Exterior oil paint	
Exterior galvanized surfaces	As previously specified MIL-P-26915, Type I, Class A	TT-P-641, Type II or	Exterior oil paint	None
Exposed interior oil based calking compound	As specified in SECTION: CALKING AND SEALANTS	TT-P-38	Same as adjacent areas	Same as adjacent areas
Interior concrete floors	As previously specified	Concrete stain	Concrete stain	P-P-155
Interior concrete masonry units, concrete except concrete floors, and gypsum board, unless otherwise specified	As previously specified. Fill surface of concrete masonry with TT-F-1098 filler.	TT-P-29	TT-E-543 or TT-E-545	TT-E-508 or TT-E-509
Interior concrete and concrete masonry units, in toilets	As previously specified. Fill surface of concrete with TT-F-1098 filler.	TT-C-535, Type II	TT-C-535, Type II	
Interior exposed wood and ferrous surfaces, unless otherwise specified	As previously specified	TT-E-535 or	TT-E-508 or	

PAINING SCHEDULE (Cont)

<u>Surface</u>	<u>Surface Preparation</u>	<u>1st Coat</u>	<u>2nd Coat</u>	<u>3rd Coat</u>
Interior unpainted ferrous surfaces in exposed areas areas having unpainted adjacent surfaces	Solvent cleaning and wire brushing;	TT-V-51	None	
Ferrous surfaces of mechanical and electrical equipment that has been factory primed	Solvent clean as specified	TT-E-489, Class A	TT-E-489, Class A	None
Interior galvanized surfaces, unless otherwise specified	As previously specified	Two coats of paint to match adjacent areas		
Convactor enclosures, electrical conduit runs, metallic tubing, uninsulated ducts and pipes, pipe hangers, louvers, grilles, and air outlets in areas having painted adjacent surfaces	As previously specified	TT-E-534 or TT-E-545	TT-E-508 or TT-E-509	

PAINTING SCHEDULE (Cont)

<u>Surface</u>	<u>Surface Preparation</u>	<u>1st Coat</u>	<u>2nd Coat</u>	<u>3rd Coat</u>
Exposed to view paper facing of vapor barrier jackets of presized or adhesive finished glass cloth over insulation on pipes, ducts, and equipment, interior	Remove foreign matter	Two coats of paint to match adjacent areas		