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TT-P-86a
MAY 6 1949
SUPERSEDING
Fed. Spec. TT-P-86
September 8, 1939

FEDERAL STANDARD STOCK CATALOG

Section IV

(Part 5)

FEDERAL SPECIFICATION

FOR

PAINT; RED-LEAD-BASE, READY-MIXED

This specification was approved on the above date by the Director, Bureau of Federal Supply, for the use of all departments and establishments of the Government, and shall become effective not later than August 15, 1949, for use in procurement initiated on or after that date. It may be used prior thereto, if any earlier date after promulgation.

A. APPLICABLE SPECIFICATIONS

A-1. The following Federal Specifications, of the issues in effect on date of invitation for bids, shall form a part of this specification:

- RR-S-366—Sieves, Standard, Testing.
- TT-D-643—Driers; Naphthenate, Liquid, Concentrated.
- TT-O-363—Oil; Linseed, Raw (For Use in Organic Coatings).
- TT-P-141—Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing.
- TT-R-191—Red-Lead; Dry and Paste-in-Oil.
- TT-R-266—Resin, Alkyd; Solutions.
- TT-T-291—Thinner; Paint, Volatile Mineral Spirits (Petroleum-Spirits).

B. TYPES

B-1. Ready-mixed red-lead-base paint covered by this specification shall be furnished in the following types, as specified in the invitation for bids, contract, or order (see par. 1-1):

- Type I. —Red lead [illegible]-oil paint.
- Type II. —Red lead mixed pigment-alkyd varnish-linseed oil paint.
- Type III.—Red lead-alkyd varnish paint.
- Type IV.—Red lead mixed pigment-phenolic varnish paint.

C. MATERIAL

C-1. See section E.

D. GENERAL REQUIREMENTS

D-1. See section E.

[illegible]

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E. DETAIL REQUIREMENTS

E-1. *Color.*—Type I, type III, and type IV paint shall have the usual red lead color, and type II paint shall have the color characteristic of a blend of red lead and red iron oxide.

E-2. *Pigment.*—The pigment used in the formulation of the paint shall be as specified in table I for the respective types.

TABLE I.—*Pigment composition.*

Pigment	Requirements (percent by weight)							
	Type I		Type II		Type III		Type IV	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Red lead (TT-R-[illegible], type I, grade C)	[illegible]		[illegible]		[illegible]		[illegible]	
Aluminum stearate	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Red iron oxide pigment [illegible] percent Fe_2O_3[1]			[illegible]					
Magnesium silicate				[illegible]			[illegible]	
Iron, [illegible] mesh			[illegible]	[illegible]				
Diatomaceous silica							[illegible]	

[1] The iron oxide pigment shall be on a silicone base (not calcium sulfate).

E-2a. The extracted pigment upon analysis shall conform to the quantitative requirements of table II for the respective types.

TABLE II.—*Quantitative requirements of pigment.*

Characteristics	Requirements (percent by weight)							
	Type I		Type II		Type III		Type IV	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Free red lead (Pb_3O_4)	[illegible]		[illegible]		[illegible]		[illegible]	
Iron oxide (Fe_2O_3)			[illegible]					
Siliceous matter				[illegible]				[illegible]

E-3. *Vehicles.*—All vehicles shall be free from resin and resin derivatives when tested as described in paragraph F-2a. The component parts of the vehicle used in the paint shall be as follows and in the proportions specified in table V for the respective types.

E-3a. *Type I.*—The vehicle for type I paint shall be a blend of raw linseed oil, pale heat-bodied linseed oil, mineral spirits, and drier.

E-3b. *Type II.*—The vehicle for type II paint shall consist of raw linseed oil blended with a glyceryl-phthalate-type varnish composed of a linseed-oil-modified resin together with the necessary driers and volatile thinners.

E-3c. *Type III.*—The vehicle for type III paint shall consist of a glyceryl-phthalate-type varnish composed of a linseed-oil-modified resin together with the necessary amounts of driers and volatile solvents and thinners.

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E-44. *Type IV.*—The vehicle for type IV paint shall be a straight phenolic spar varnish reducible for grinding with red lead and shall consist of a 55-gallon-length varnish composed of 55 gallons of tung oil and 100 pounds of a 100-percent-pure, non-heat-hardening phenolic resin plus the necessary driers and volatile thinners.

E-44(1). The resin as specified herein for use in the vehicle for type IV paint shall be of but one grade, namely, that known commercially as a 100-percent pure tertiary amyl, pure [illegible] resin and shall conform to the requirements of table III.

TABLE III.—*Properties of the phenolic resin.*

Characteristics	Requirements	
	Minimum	Maximum
Specific gravity at 77°C.	1.00	1.05
Softening point (ring and ball method),	220	230
Color (50 percent solution in xylene, Gardner-Holdt scale),		10
Ash, percent		0.05
Compatibility in ethyl alcohol (50 percent solids)[1]	Clear	

[1] Solution with alcohol must dissolve [illegible]. Remains clear 24 hours.

E-44(2). The phenolic resin tung oil varnish as specified herein for use in the vehicle for type IV paint shall conform to the requirements of table IV. A suggested formula and cooking schedule for the varnish is outlined in paragraph 4-7, note (*).

TABLE IV.—*Properties of the phenolic varnish.*

Characteristics	Requirements	
	Minimum	Maximum
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

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TABLE V.—*Vehicle composition.*[1]

Ingredients	Requirements (percent by weight)							
	Type I		Type II		Type III		Type IV	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
[illegible]	[illegible]	[illegible]	[illegible]	.....	.....	.....	.....	.....
[illegible]	[illegible]	[illegible]	.....	.....	.....	.....	.....	.....
[illegible]	.....	.....	[illegible]	.....	[illegible]	.....	.....	.....
[illegible]	.....	.....	.....	.....	.....	.....	[illegible]	.....
[illegible]	.....	[illegible]	.....	[illegible]	.....	[illegible]	.....	[illegible]

[1] Vehicles may contain appropriate amounts of anti-oxidants and wetting aids.

E-4. *Paint quantitative requirements.*—The paints shall meet the quantitative requirements specified in table VI for the respective types.

TABLE VI.—*Quantitative requirements of the paints.*

Characteristics	Requirements							
	Type I		Type II		Type III		Type IV	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Pigment, percent by weight	[illegible]	.....	[illegible]	.....	[illegible]	.....	[illegible]	.....
Nonvolatile vehicle, percent by weight of vehicle	[illegible]	.....	[illegible]	.....	[illegible]	.....	[illegible]	.....
Phthalic anhydride, percent by weight of nonvolatile vehicle	.....	.....	[illegible]	.....	[illegible]	.....	.....	.....
Oil acids, percent by weight of nonvolatile vehicle	.....	.....	[illegible]	.....	[illegible]	.....	.....	.....
Iodine number of extracted fatty acids	[illegible]	[illegible]	.....	.....	.....	.....	.....	.....
Rosin reduction on saponified vehicle, percent	[illegible]	[illegible]	.....	.....	.....	.....	[illegible]	[illegible]
Unsaponified water, percent by weight of paint	.....	0.5	.....	0.5	.....	0.5	.....	0.5
Coarse particles and skins [illegible]	.....	1	.....	0	.....	1	.....	0
Consistency								
Krebs-Stormer, changing rate, [illegible]								
Grams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Equivalent K.U.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	.....	14.7	.....	14.4	.....	14.7	.....
Drying time								
Set to touch, hours	.....	[illegible]	.....	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dry through, hours	.....	[illegible]	.....	[illegible]	.....	[illegible]	.....	[illegible]
Flash point	[illegible]	.....	[illegible]	.....	[illegible]	.....	[illegible]	.....

[1] Conforming to Federal Specification [illegible].

E-5. *Qualitative requirements.*—

E-5a. *Condition in container.*—The paint shall not show excessive settling in a freshly-opened, full can, and shall be easily redispersed with a paddle to a smooth, homogeneous state. The paint shall show no curdling, livering, caking, or color separation, and shall be free from lumps and skins. (See para. E-5f and I-4.)

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E-5b. *Dilution stability.*—The paint shall remain stable and uniform after reduction in the proportions of eight parts by volume of the packaged material with not more than one part by volume of mineral spirits conforming to Federal Specification TT-T-291, grade 1.

E-5c. *Brushing properties.*—The paint as received shall brush easily, possess good leveling properties, and show no running or sagging tendencies when applied at a spreading rate of 500 square feet per gallon to smooth steel vertical surfaces.

E-5d. *Spraying properties.*—The paint when reduced as specified in paragraph E-5b, shall spray satisfactorily, show no tendency to orange-peel, sag, creep, or run, and show satisfactory spraying properties, in all other respects.

E-5e. *Flexibility.*—The paint shall show no cracking when tested in accordance with paragraph F-2a. (See applicable footnotes to table in par. F-2a.)

E-5f. *Skinning.*—The paint shall not skin within 48 hours in a three-quarters-filled, closed container.

E-5g. *Appearance.*—The paint shall dry to a smooth uniform finish free from roughness, grit, unevenness, and other surface imperfections (see par. F-2d(1)). The paint shall show no streaking or separation when flowed on clean glass. (See par. F-2d(2).)

E-5h. *Hot water resistance (type IV, varnish only).*—The phenolic varnish film after recovery from immersion in boiling water (see footnote 4 to table in par. F-2a) shall show no evidence of blistering, dulling, whitening, or loss of adhesion.

E-5i. *Alkali resistance (type IV, varnish only).*—The phenolic varnish film after recovery from alkali immersion (see footnote 4 to table in par. F-2a) shall show no change in appearance such as haze spots, pits, or loss of adhesion.

E-5j. *Cold water resistance (type IV, paint).*—When exposed to cold distilled water as specified in paragraph F-2c, the film of paint shall show no blistering or wrinkling immediately upon removal of the panel. There shall be no softening of the film and not more than a very slight whitening when examined 2 hours after removal.

E-5k. *Storage stability.*—Unless otherwise specified by the procuring agency, the paint shall show no thickening, curdling, gelling, or hard caking when stored for 6 months, from the date of delivery to the Government procuring agency, in a full, tightly-covered container, at a temperature of 21° to 32°C. (70° to 90°F.).

F. METHODS OF SAMPLING, INSPECTION, AND TESTS

F-1. *Sampling.*—Sampling shall be performed in accordance with method 102.1 of Federal Specification TT-P-141. Samples of type IV paint shall be accompanied by samples of the resin and the varnish used in its manufacture. (See pars. I-5 and I-6.)

F-2. *Tests.*—Tests shall be made in accordance with the applicable methods of Federal Specification TT-P-141 and as specified hereinafter:

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P-3a. The following tests shall be conducted in accordance with Federal Specification TT-P-141:

Tests	Methods
[illegible]	[illegible]
[illegible]	Procedure A
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

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bottom during the drying and drying period. The panel shall be cut in half and one half turned for examination. The other half shall be similarly processed vertically in a beaker of distilled water at 21°C. for 1 hours. The panel after removal shall be observed 1 hours after any loss of condensation.

G. Alkali resistance (type IV, varnish only).—To the closed end of a solvent (benzol) cleaned 1 x 4 inch test plate is applied a drop of 1 inches long the varnish coating, and place to dry in a horizontal position, that is, with the coating of the drop on top. Place the other end of the test plate which was contaminated during the test (drying) period 1 inches below the surface of a 1 percent sodium hydroxide solution at 21° plus 1° for 1 hours. Remove and immediately rinse under gently running tap water. Dry for 1 hours at room temperature and examine.

F-2h. *Dry through time.*—Prepare a panel as described in 1.1 of method 4061. The film shall be considered dry through when it cannot be disturbed or removed by the following test: Place the panel in a horizontal position at a height that when the thumb is placed on the film, the arm of the operator is in a straight line from wrist to shoulder. Bear downward on the film with the full area of the ball of the thumb, exerting the maximum pressure of the arm only (not body weight) simultaneously turning the thumb through an angle of 90° in the plane of the film. Examine for loosening, detachment, wrinkling, or other evidence of distortion of the film.

F-2i. *Cold water resistance (type IV, paint).*—Apply two coats of type IV paint to both sides of the solvent-cleaned panel (method 2011) by brushing (method 2031), allowing 24 hours for air-drying between coats (section 200 of Fed. Spec. TT-P-141). After the coated panel has air-dried for 96 hours, dip the edges of the panel in a water-resisting varnish and air-dry for an additional 24 hours. Place the panel in a beaker containing approximately 3 inches of distilled water at room temperature 21° to 27°C. (70° to 90°F.) and allow to remain for 14 days. Remove, allow to dry for 2 hours at room temperature, and examine the coating for the defects specified in paragraph E-8j.

F-2d. *Appearance of paint coat.*—

F-3d(1). Examine the prepared panels for brushing and spraying properties. (See par. F-2a.)

F-3d(2). Flow a portion of the paint on a clean glass plate. Let dry in a nearly vertical position at room temperature and examine 4 inches from the top.

F-3e. *Analysis of pigment.*—

F-3e(1). *Siliceous extender and mica.*—Transfer 0.5 gram of the pigment to a 400-milliliter beaker. Add 15 milliliters of concentrated hydrochloric acid and heat gently until the iron oxide and red lead are completely dissolved. Evaporate to dryness and bake at 105° to 110°C. for 1 hour. Moisten the residue with a few drops of concentrated hydrochloric acid, dilute to 100 milliliters with hot water, boil, filter, and wash with hot water. Transfer the paper and contents to a weighed porcelain crucible, ignite, cool, and weigh. Examine the residue microscopically to determine the presence of mica. Calculate the percentage and report this residue as the siliceous extender and mica.

F-3f. *Analysis of phenolic resin.*—

F-3f(1). *Specific gravity.*—A piece of resin, 4 to 6 grams in weight shall be weighed first in air and then in water at 77°F. to

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the nearest milligram. The resin shall be free from bubbles, cracks, dust, and abrupt depressions. The piece shall be suspended on a loop of fine wire during the weighings. The determination shall be repeated on three separate pieces and the average result reported.

F-2f(3). Softening point.—

F-2f(3)a. Apparatus (see fig. 1).—The apparatus shall consist of the following:

(a) Two circular brass plates, $\frac{1}{16}$ inch thick and $\frac{7}{8}$ inches in diameter; one plate has three holes equally spaced about its center, each $\frac{1}{2}$ inch in diameter. A shoulder $\frac{1}{32}$ inch deep and $\frac{1}{16}$ inch wide is cut around each hole so that the molds will fit snugly without danger of sliding off. These plates shall be attached to one end of a threaded steel rod, $\frac{1}{2}$ inch by 12 inches, through their centers, by means of $\frac{1}{4}$ inch hexagonal nuts, in such a manner that their opposing faces are $\frac{1}{2}$ inch apart and parallel.

(b) Three corrosion-resisting steel molds, $\frac{1}{2}$ inch outside diameter, $\frac{5}{16}$ inch deep, diameter of hole at top $\frac{11}{32}$ inch, diameter of hole at bottom $\frac{3}{8}$ inch; permissible variation in all dimensions of 0.01 inch.

(c) Steel ball bearings, $\frac{3}{32}$ inch in diameter, and weighing between 1.97 and 2.07 grams.

(d) Glass beaker, 1.5 liter capacity.

(e) Well-annealed glass test tube, 8 inches long by 2½ inches inside diameter.

(f) Two standardized thermometers, 0 to 400°F. range, 0.25 inch in diameter, and 16 inches long.

F-2f(3)b. Preparation of sample.—Powder the sample in a mortar or break into pieces the size of wheat grains. Place the empty molds on an amalgamated brass plate, fill with the ground resin, apply slight heat to the brass plate, and pack the melting resin down into the mold with a spatula. Continue until the mold is filled level with the top and there are no bubbles showing. Separate the mold from the amalgamated plate and trim off the excess resin with a knife. It is convenient to make an indentation of not more than 1 millimeter in the center of the molded resin to prevent the steel ball from rolling off. The resin in the molds should be clear, fused masses. Only enough heat is applied during filling to melt the resin sufficiently to be packed down smooth. All this operation should be done as rapidly as possible to avoid excessive loss of easily volatilized substances in the resin.

F-2f(3)c. Procedure.—Assemble the apparatus as illustrated by figure 1. See that the bottom of the inner thermometer is even with the bottom of the steel ball on top of the molded resin and the bulb of the outer thermometer is so suspended as to be opposite the lower brass plate. Fill the beaker with water-white glycerine to within ½ inch of the top when the test tube is immersed. Heat the beaker containing the glycerine, with test tube and outer thermometer in place, to 150°F. (66°C.). Introduce the resin rings and inner thermometer so that the bottom plate is 1¼ inches above the bottom of the test tube. Continue heating and regulate it so that there will be a rise in temperature of 4° to 5°F. (2° to 3°C.) per minute in the bath. The temperature

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JAN-P-106—Packaging and Packing for Overseas Shipment—Boxes; Wood, Nailed.

JAN-P-108—Packaging and Packing for Overseas Shipment—Boxes, Fiberboard (V-Board and W-Board), Exterior and Interior.

JAN-P-124—Packaging and Packing for Overseas Shipment—Containers (Cans, Pails, and Drums), Metal (for Other than Subsistence Items).

U. S. Army Specification:

100-2—Standard Specification for Marking Shipments by Contractors.

(*Copies of specifications required for Army purchases may be obtained upon application to the procuring agency. Both the title and identifying symbol or number should be stipulated when requesting copies.*)

H-2b. *Packaging for overseas shipment.*—Unless otherwise specified, the paint shall be packaged in 1-gallon cans, 5-gallon steel pails, or in 55-gallon steel drums, as specified in the invitation for bids.

H-2b(1). *One-gallon cans.*—When specified, 1-gallon cans shall conform to the requirements for class A of Federal Specification RR-C-96 for cylindrical friction-cover cans.

H-2b(2). *Five-gallon steel pails.*—Five-gallon steel pails shall conform to the requirements for type VI of Joint Army-Navy Specification JAN-P-124. Pails shall be of the lug-cover type with 16 lugs.

H-2b(3). *Fifty-five gallon steel drums.*—When specified, 55-gallon steel drums shall conform to the requirements for type IV of Federal Specification RR-D-741.

H-2c. *Packing for overseas shipment.*—

H-2c(1). *One-gallon cans.*—Four 1-gallon cans shall be packed in a snug-fitting cleated plywood or nailed wood box, conforming to the requirements of Joint Army-Navy Specifications JAN-P-106 and JAN-P-108, respectively. Each can shall be separated from the adjacent cans by a full-height, full-width, double-faced corrugated-board divider. In addition, top and bottom pads shall be provided. Corrugated board shall conform to the requirements of Joint Army-Navy Specification JAN-P-108, type CF, grade 2.

H-2c(2). *Five-gallon pails and 55-gallon drums.*—Five-gallon steel pails and 55-gallon steel drums will not require overpacking.

H-2d. *Marking and labeling.*—

H-2d(1). *Packages.*—Unless otherwise specified, each package shall be marked or labeled in accordance with the requirements of paragraph G-2.

H-2d(2). *Shipping containers.*—In addition to any marking required by the contract or order, marking of shipping containers for Army purchases shall conform to the requirements of U. S. Army Specification 100-2.

H-3a. *Use of type IV paint for Army.*—Interiors of potable water tanks will not be given red lead coatings. For other work,

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type IV will be used where suitable for the intended use. However, formulations for submerged exposures frequently must be based on local conditions.

H-3. *Navy.*—

H-3a. *Applicable specifications and other publications.*—

Federal Specifications:

LLL-B-631—Boxes; Fiber, Corrugated (for Domestic Shipment).

LLL-B-636—Boxes, Fiber, Solid (for Domestic Shipment).

Joint Army-Navy Specifications:

JAN-P-106—Packaging and Packing for Overseas Shipment—Boxes; Wood, Nailed.

JAN-B-107—Boxes, Wood, Wirebound (Overseas Type).

JAN-P-124—Packaging and Packing for Overseas Shipment—Containers (Cans, Pails, and Drums), Metal (for Other than Subsistence Items).

Navy Department Specification:

General Specifications for Inspection of Material.

Bureau of Supplies and Accounts Publication:

Navy Shipment Marking Handbook.

(Copies of Federal and Joint Army-Navy specifications required for Navy purchases, Navy Department specifications, and the Navy Shipment Marking Handbook may be obtained without cost upon application to the Bureau of Supplies and Accounts, Navy Department, Washington 25, D. C., except that Naval activities should make application to the Supply Officer in Command, Naval Supply Center, Norfolk 11, Va. Both the title and identifying symbol or number should be stipulated when requesting copies of specifications.)

H-3b. *Packaging for domestic and overseas shipment.*—The paint shall be furnished in 1-gallon, multiple-friction-top cans or in 5-gallon, lug-cover steel pails, as specified in the contract or order.

H-3b(1). *One-gallon cans.*—One-gallon, multiple-friction-top cans shall conform to the requirements for type IV of Joint Army-Navy Specification JAN-P-124.

H-3b(2). *Five-gallon steel pails.*—Five-gallon, lug-cover, steel pails shall conform to the requirements for type VI of Joint Army-Navy Specification JAN-P-124.

H-3c. *Packing.*—

H-3c(1). *For domestic shipment.*—

H-3c(1)a. *One-gallon cans.*—Four 1-gallon cans shall be packed in a nailed wood box or wire-bound wood box conforming to the requirements of Joint Army-Navy Specifications JAN-P-106 and JAN-B-107, respectively, or in a style ESC corrugated or solid fiberboard box having a minimum Mullen test of 273 pounds and conforming to the requirements of Federal Specifications LLL-B-631 and LLL-B-636, respectively. No strapping will be required.

H-3c(1)b. *Five-gallon steel pails.*—Five-gallon, lug-cover, steel pails will require no overpacking.

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H-3c(2). *For overseas shipment.*—

H-3c(2)a. *One-gallon cans.*—Four 1-gallon cans shall be packed in a nailed wood box or wirebound wood box conforming to the requirements of Joint Army-Navy Specifications JAN-P-106 and JAN-B-107, respectively.

H-3c(2)b. *Five-gallon steel pails.*—Five-gallon, lug-cover, steel pails will require no overpacking.

H-3d. *Marking.*—In addition to any special marking required by the contract or order, marking of interior packages and shipping containers shall be in accordance with the requirements of the Navy Shipment Marking Handbook.

H-3e. *Ordering information.*—Requests, requisitions, schedules, and contracts or orders should specify the type of container required and whether domestic or overseas packing is required. (See para. H-3b and H-3c.)

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H-4. *Air Force.*—Unless otherwise specified in the contract or order, each shipping container shall be marked in accordance with the requirements of U. S. Army Specification 94-40645, Marking; Exterior, Domestic and Export Shipment, by Contractors. (Copies of specifications required for Air Force purchases may be obtained from the Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio).

I. NOTES

I-1. *Intended use of the paint.*—

I-1a. *Types I and II.*—Type I and type II paints are intended for use on bridges, similar structural steel, and other ferrous metal surfaces. They are suitable for priming and body coats, either in the shop or field, where good resistance to the corrosive effects of usual atmospheric environments is required. Type I paint may be used wherever painting schedules do not demand recoating in less than 36 hours. The vehicle solids, being all linseed oil, offer the best opportunity to wet the metal surface painted and therefore to obtain an intimate bond of the paint with the surface despite the presence of small amounts of corrosion products found impractical to remove. Type II paint is designed for use where painting schedules require handling and recoating in 16 hours. The presence of the specified amount of free linseed oil in this type of paint is desirable for the purpose of obtaining intimate bonding with the metal surface due to the wetting characteristics of the oil.

I-1b. *Type III.*—Type III paint is intended for use in painting thoroughly clean iron and steel surfaces and for touch-up work where drying within a 6-hour period is desired. It is intended for use on smooth steel particularly, as an industrial primer for priming articles fabricated at the factory, such as railroad cars, window sash, air-conditioning conduits, etc. It may be used as a general maintenance primer for touch-up work on thoroughly cleaned steel where rapid drying is essential and where the application of two coats within a day is desired. It is essential that paints of this type be applied to exceptionally clean surfaces, since due to their fast drying properties and reduced oil content, they do not

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have the surface wetting properties which characterize paints containing free linseed oil. Thus, because structural steel (bridges, tanks, etc.) is rarely cleaned free of corrosion products, this paint is not generally intended for such use, although with due consideration to surface preparation it can be so used for spot priming.

I-1c. *Type IV.*—Type IV paint is intended for use as a primer on iron and steel surfaces particularly as those subjected to severe humid conditions or fresh water immersion. In addition to its excellent water impermeability, the paint film exhibits good resistance to acid and alkaline environments. Water storage tanks, structural work on dams, structural metal and equipment in bottling plants, laundries, and mines are typical of the steel surfaces for which this paint is particularly effective as a protective coating. The same precautionary steps should be taken to insure a clean surface for application as required for the type III paint.

I-2. *Ordering data.*—Purchasers should specify the type of paint required, and should exercise any desired options offered herein. (See pars. B-1, E-5k, G-1, G-2, G-3, H-2b, H-3d(1), H-3e, and H-4.)

I-3. Paint covered by this specification should be purchased by volume (231 cubic inches equals 1 U. S. gallon).

I-4. It is suggested to procurement officers making purchases of red lead paint for stock, that amounts sufficient to cover the needs for not over approximately 6 months in advance be purchased at one time. Storage of the product under normal warehouse conditions is permissible, although long exposure to either extremely high or low temperatures should be avoided.

I-5. Attention of Government procuring agencies is directed to paragraph E-5k. In order that the testing laboratory may make the "storage stability" determination, it will be necessary that the date of delivery be marked on the sample submitted for test or that this information be contained in the letter of transmittal.

I-6. Samples of delivered paint of types I, II, and III may be taken in the regular manner and submitted for test. In order to determine compliance of type IV paint with the specification, however, it will be necessary for the purchaser to submit to the testing laboratory samples of the resin and the varnish used in the manufacture of the paint in addition to a sample of the finished paint.

I-7. Typical formulas (with all percentages by weight) for the four types of paint meeting this specification are as follows:

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	Type I	Type II	Type III	Type IV
Red lead, (Fed. Spec. TT-R-191, type I, grade C)	77.00	84	87.34	84.00
Red lead oxide pigment (if pigment Fed Sp		84		
Magnesium silicate (Fed Spec. TT-M-00		9.22		1.00
Mica, talc (Fed Spec. [illegible] type II)		5.00		
Thixotropic agent (Aluminum Compounds Spec. No. [illegible] type I)				
Aluminum stearate (Fed Spec. [illegible])	1.00	1.00	1.00	1.00
Raw linseed oil (Fed. Spec. TT-[illegible]	18.00	8.44		
Raw linseed treated with Heavy Spec. [illegible]	0.00			
Alkyd resin, varnish (based on Fed. Spec. [illegible] type III)		35.00	37.00	34.00
Phenolic varnish				
Mineral spirits (Fed. Spec. TT-T-291, grade I)	6.00	4.00		
Aluminum pigment, paste (Fed. Spec. TT-A-[illegible]			4.75	7.00
Pigment (Fed. Spec. TT-O-[illegible]				2.00
Anti-skinning and bodying aids			0.00	4.00
Lead naphthenate (6 percent Pb) (Fed. Spec. TT-[illegible]		0.00		0.00
Cobalt naphthenate (6 percent Co) (Fed. Spec. TT-[illegible]		0.00	0.00	0.00
Manganese naphthenate (6 percent Mn) (Fed. Spec. TT-[illegible]				0.00
Mineral driers (Fed. Spec. TT-D-[illegible] type II)	1.11			
Pigment volume (PV)	00	00	00	00
Weight per gallon, pounds	00	00	00	00

1 A difference type of red lead from oxide containing not less than 90 percent Pb_3O_4.

2 Miscellaneous of type I paint are mentioned to use a Bentone-34 variable having less field values than given 8 based on field evidence. An important point in this recommendation is that the lower content of water in the variable should be helpful at a low temperature.

3 A typical formula, with all percentages by weight, for varnish meeting the requirements for type II is as follows: 100 parts phenolic resin (see par. 3.4.1.1.1

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1-10. It is believed that this specification adequately describes the characteristics necessary to secure the desired material and that normally no samples will be necessary prior to award to determine compliance with this specification. If, for any particular purpose, samples with bids are necessary, they should be specifically asked for in the invitation for bids, and the particular purpose to be served by the bid samples should be definitely stated, the specification to apply in all other respects.

1-11. Federal specifications do not include all types, classes, grades, sizes, etc., of the commodities indicated by the titles of the specifications, or which are commercially available, but are intended to cover the types, etc., which are suitable for Federal Government requirements.

1-12. An Index of Federal Specifications may be purchased as noted in the paragraph below, price to be obtained from the Superintendent of Documents.

1-13. Copies of this specification and of those referred to in paragraph A-1 may be obtained upon application, accompanied by postal note, money order, coupon, or cash to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Price 5 cents each; except TT-P-141, $2.00.

Notice.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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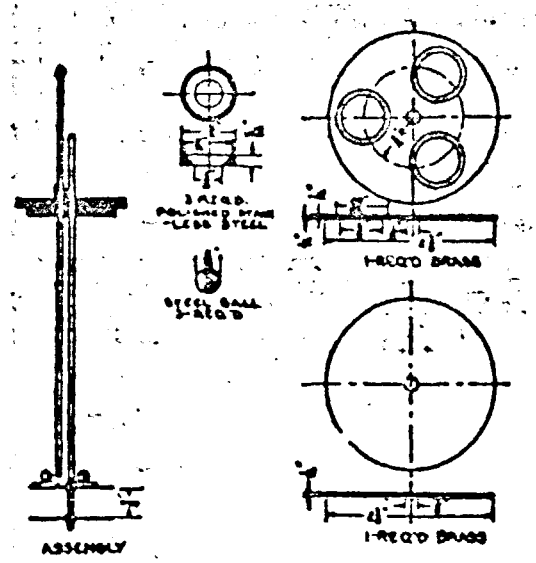

FIGURE 1.—*Detail of softening point apparatus for phenolic resin in type IV paint.*

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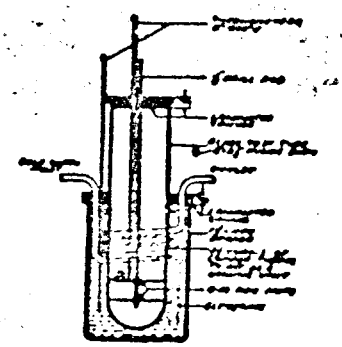

FIGURE 2.—Cross section of softening point apparatus assembly.

For sale by the Superintendent of Documents, Washington 25, D. C.
Price 5 cents

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recorded by the inner thermometer at the instant the ball drops through the ring and touches the bottom brass plate shall be taken as the softening point of the sample.

F-2g. *Analysis of phenolic varnish.*—

F-2g(1). *Tests on varnish as specified.*—The following tests shall be made on the varnish as specified for use in type IV paint before the addition of driers and additional thinners: Nonvolatile, viscosity, color, and weight per gallon. (See par. F-2a.)

F-2g(2). *Tests on varnish after thinning and adding driers.*—All other tests to be run on the varnish specified (par. F-2d(2)) shall be made after the following additions of driers and thinners: Sufficient naphthenate driers conforming to the requirements for types I (lead), II (cobalt), and III (manganese) of Federal Specification TT-D-643 shall be added to the varnish to give 0.3 percent lead, 0.03 percent cobalt, and 0.015 percent manganese, expressed as metals and based on the oils in the varnish. Sufficient thinner conforming to Federal Specification TT-T-291, grade 1, shall also be added to give a viscosity of C-E (Gardner Bubble Viscometer). Driers should be allowed an incorporation time of 48 hours before proceeding with any of the tests.

G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT

G-1. *Packaging.*—Unless otherwise specified, commercial packages will be acceptable.

G-2. *Packing.*—Unless otherwise specified, the subject commodity shall be packed in substantial commercial containers of the type, size, and kind commonly used for the purpose, so constructed as to insure acceptance and safe delivery by common or other carriers, at the lowest rate, to the point of delivery called for in the contract or order.

G-3. *Marking.*—Unless otherwise specified, shipping containers shall be marked with the name of the material, the type, and the quantity contained therein, as defined by the contract or order under which the shipment is made, the name of the contractor, and the number of the contract or order.

H. REQUIREMENTS APPLICABLE TO INDIVIDUAL DEPARTMENTS

H-1. The following specifications and other publications, of the issues in effect on date of invitation for bids, and special requirements, shall form a part of this specification, and shall be applicable to purchases made under this specification by the respective departments.

H-2. *Army.*—

H-2a. *Applicable specifications.*—

Federal Specifications:

RR-C-96—Cans, Steel (Tinned-Plate, Terne-Plate, and Black-Sheet); Friction-Covers.

RR-D-741—Drums; Steel, Type 6C (for Inflammable Solids or Oxidizing Materials).

Joint Army-Navy Specifications:

JAN-P-106—Packaging and Packing for Overseas Shipment—Boxes, Wood, Cleated, Plywood.