

TT-P-001984 (COM-NBS)
September 18, 1975

INTERIM FEDERAL SPECIFICATION

PRIMER COATING, LATEX BASE, EXTERIOR,
(UNDERCOAT FOR WOOD), WHITE AND TINTS

This Interim Federal Specification was developed by U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20234, based upon currently available technical information. It is recommended that Federal agencies use it in procurement and forward recommendations for changes to the preparing activity at the address shown above.

1. SCOPE

1.1 Scope. This specification covers a ready-mixed latex primer coating for application to exterior wood surfaces.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

- TT-P-19 - Paint, Acrylic Emulsion, Exterior.
- TT-P-102 - Paint, Oil Alkyd (Modified), Exterior, Fume Resistant, Ready Mixed, White and Tints.
- TT-P-105 - Paint, Oil: Chalk Resistant, Lead Free, Exterior Ready-mixed, White and Tints.
- TT-P-1510 - Paint, Latex Exterior, For Wood Surfaces, White and Tints.
- PPP-P-1892 - Paints, Varnish, Lacquer, and Related Materials; Packaging, Packing and Marking of.
- PPP-T-60 - Tape: Pressure-sensitive Adhesive; waterproofing (For Packaging).

Federal Standards:

- Fed. Test Method Std. No. 141 - Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling and Testing.
- Fed. Std. No. 595 - Colors.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specification:

MIL-P-52324 - Paint, Oil, Alkyd, Exterior, White and Light Tints.

(Copies of Military Specifications and Standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

- D 562 - Consistency of Paint, Using the Stormer Viscosimeter.
- D 1210 - Fineness of Dispersion of Pigment - Vehicle Systems.
- D 2247 - Coated Metal Specimens at 100 Percent Relative Humidity.
- D 3273 - Tentative Method of Test for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- D 3335 - Low Concentrations of Lead in Paint by Atomic Absorption Spectroscopy.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

3. REQUIREMENTS

3.1 Material. The ready-mixed primer as received shall consist of the pigment and vehicle specified, so combined as to produce a primer meeting all the requirements of this specification. The primer shall not contain lead in excess of present existing Federal requirements which is 0.5% lead by weight in the total nonvolatile content of liquid paint or in the dried paint film. The primer shall be free from other material which will be toxic to personnel under normal conditions of use.

3.1.1 Pigments. The pigments, including extenders, shall be lightfast and alkali resistant.

3.1.2 Vehicle. The vehicle shall consist of a water dispersion such as acrylic, modified acrylic or vinyl-acrylic resins. A preservative shall be present together with the minimum amounts of other necessary additives such as emulsifiers, pigment-dispersants, antifoaming agents, antistaining agents, etc., provided the primer meets all the requirements specified herein.

3.2 Quantitative requirements. The quantitative requirements of the primer shall be as specified in table I.

TABLE I. Quantitative requirements

Characteristics	Requirements	
	Minimum	Maximum
Viscosity, Krebs-Stormer, shearing rate 200 r.p.m.		
Grams	150	275
Equivalent Krebs Units (K.U.)	72	92
Pigment, percent by weight of paint	26	---
Nonvolatile organic material, percent by weight of paint	35	---
Dry hard, hour	---	1
Fineness of grind	3	---
Lead, metal, percent by weight of nonvolatile matter	---	0.5

3.3 Qualitative requirements.

3.3.1 Condition in container. The paint, as received shall be ready-mixed and shall show no evidence of mold growth, livering, skinning putrefaction, rust from corrosion of the container, or hard settling of the pigment. Any settled pigment shall be readily dispersible in the liquid portion by hand stirring to form a smooth homogeneous paint, free from persistent foam.

3.3.2 Colors. Unless otherwise specified the primer shall be white. When specified (see 6.2), the primer shall be tinted to a practical match of the specified reference standard.

3.3.3 Flexibility. When tested as described in 4.2.2, the primer shall show no evidence of cracking, chipping, or flaking.

3.3.4 Working properties. When tested as described in 4.2.3, the primer shall brush and spray easily at package consistency and shall permit lapping without difficulty. When dry, the surface shall be free from craters, sags and runs, conspicuous laps, or objectionable brush marks.

3.3.5 Storage stability. The primer, as received, shall withstand the freeze-thaw test and the heat storage test described in 4.2.4 with a viscosity change not greater than 5 K.U. After completion of these tests the paint applied to a wood panel shall dry to a smooth, uniform finish.

3.3.6 Adhesion. A film of the primer tested as in 4.2.6 shall show no removal of the primer by the adhesive tape beyond 1.6 mm (1/16 in) on either side of the score line.

3.3.7 Stain resistance. When tested as described in 4.2.7, the primer shall show a change in 45 deg. directional reflectance no greater than 20 units after exposure.

3.3.8 Fungus resistance. When painted panels are examined as specified in table II, they shall have a rating of 4 or greater as described in ASTM method D 3273.

3.3.9 Sealing properties. The primer shall seal new wood surfaces uniformly when tested as specified in 4.2.8. When top coated as specified in 4.2.8, the dried paint film shall exhibit a uniform appearance.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Sampling and inspection. Sampling and inspection shall be performed in accordance with method 1031 of Fed. Test Method Std. No. 141.

TABLE II. Index

Characteristics	Requirement reference	Test Method	
		Fed. Test Method Std. No. 141 or ASTM methods	Paragraph reference
Condition in container	3.3.1	3011	4.2.1
Color (tinted paints only)	3.3.2	4250	-----
Flexibility	3.3.3	6221	4.2.2
Working properties	3.3.4	4321, 4331	4.2.3
Storage stability	3.3.5	-----	4.2.4
Adhesion	3.3.6	-----	4.2.5
Stain resistance	3.3.7	-----	4.2.6
Fungus resistance	3.3.8	ASTM D 3273	4.2.7
Sealing properties	3.3.9	-----	4.2.8
Viscosity (consistency)	Table I	ASTM D 562	-----
Pigment	Table I	-----	4.2.9
Nonvolatile organic material	Table I	-----	4.2.9
Dry hard time	Table I	4061 [1]	-----
Fineness of grind	Table I	ASTM D 1210	-----
Lead content	Table I	ASTM D 3335	4.2.10

[1] Apply a film of the primer with a 0.0635 mm (0.002 inch) [approximately 0.005 inch gap clearance] Bird film applicator, or any other doctor blade which produces a film of the same thickness.

4.2.1 Condition in container. Examine the primer as received in accordance with method 3011 of Fed. Test Method Std. No. 141 for compliance with 3.3.1.

4.2.2 Color. The film shall be applied to clean, smooth, plate-glass, panel with a 0.0762 mm (0.002 inch) [approximately 0.006 inch gap clearance] Bird film applicator or similar blade which produces the same film thickness. Allow film to dry for 24 hours. Compare the color of the dried film in accordance with method 4250 of Fed. Test Method Std. No. 141.

4.2.3 Flexibility. The paint film shall be applied to an electrolytic tin plate panel [1] (method 2102). Supplement the test panel cleaning procedure with an additional cleaning with abrasive soap so that the entire surface of the panel is water wet. Apply the primer in accordance with method 2162 of Fed. Test Method Std. No. 141 on the clean, dry panel with a 0.0508 mm (0.002 inch) [approximately 0.004 inch gap clearance] Bird film applicator or similar blade which produces the same film thickness. Air dry for 18 hours; bake for 3 hours at 105 +/- 2 deg. C. Cool for 1/2 hour, bend over 3.175 mm (1/8 inch) mandrel, and examine in accordance with method 6221 of Fed. Test Method Std. No. 141 for compliance with 3.3.3.

4.2.4 Working properties. Determine the brushing properties in accordance with method 4331 of Fed. Test Method Std. No. 141. For the substrate use western red cedar panels, approximately 152 by 457 mm (6 by 18 inches) prepared in accordance with method 2031 of Fed. Test Method Std. No. 141. Evaluate for compliance with 3.3.4.

4.2.5 Storage stability.

4.2.5.1 Specimens and exposure. Fill two resin-lined friction-top cans with the sample as received, and close the cans tightly. Expose one can and contents three times to the following freeze-thaw cycle:

- (a) Low temperature of -9 +/- 2 deg. C (+15 +/- 3 deg. F) for 16 hours.
- (b) High temperature of 25 +/- 3 deg. C (77 +/- 5 deg. F) for 8 hours.

Store the other sample in an oven at 49 deg. C (120 deg. F) for 1 week.

4.2.5.2 Procedure.

- (a) At the completion of the exposure test measure the viscosity (ASTM D 562) of both specimens and compare with the original viscosity to determine compliance with the requirements of 3.3.5.
- (b) Brush the primer on a wood panel and observe while brushing and after drying whether the primer is normal and usable in all respects. Compare with the unexposed primer with respect to freedom from coagulation, agglomeration, speckiness and change in sheen or color.

[1] A suitable cabinet is available from Q-Panel Company, 15601 Industrial Parkway, Cleveland, OH 44135.

4.2.6 Adhesion (Tape method). Prepare a western red cedar panel, in accordance with method 2031 of Fed. Test Method Std. No. 141. Draw down a 50.8 mm (2 inch) wide film of the primer to 0.0254 mm (1 mil) dry film thickness and allow to dry at room temperature for 72 hours. Score a line through to the wood substrate across the width of the film using a sharp pointed knife. Apply tape perpendicular to and across the score line, using pressure sensitive tape conforming to PPP-T-60. Press the tape in firm contact with the film, extending it for approximately 2.54 mm (1 inch) on each side of the score line, using a rubber roller weighing approximately 2 kg (4.5 pounds); pass the roller twice over the tape. Grasp a free end of the tape, and as rapidly as possible strip it from the panel by pulling the tape back on itself at an angle of 180 deg. Observe for compliance with 3.3.6.

4.2.7 Stain resistance. Prepare western red panels [approximately 75 x 200 mm (3 x 8 inches)] in accordance with method 2031 of Fed. Test Method Std. No. 141. Draw down a 50.8 mm (2 inch) wide film of the primer to 0.0762 mm (3 mil) dry film thickness, and allow to dry for 1 hour. Measure the 45 deg., 0 deg. directional reflectance according to method 6121 of Fed. Test Method Std. No. 141. Place the panels, coated side down, in a humidity cabinet ^[1] as described in ASTM D 2247. Use a continuous condensation cycle and a 38 +/- 1 deg. C air temperature for 24 hours as the test exposure condition. Remove the panels and allow to dry for 24 hours. Measure the 45 deg., 0 deg. directional reflectance of the exposed panels. Observe for compliance with 3.3.7.

4.2.8 Fungus resistance. Test the primer in accordance with ASTM D 3273 for compliance with 3.3.8.

4.2.9 Sealing properties. Prepare three western red cedar panels [approximately 152 by 457 mm (6 by 18 inches)]. Brush a film of the primer on two of the panels at a spreading rate of 1100 square meters (450 square feet) per gallon uniformly over the surface. Allow to dry at room temperature for 48 hours. Observe the appearance of the dried film for compliance with 3.3.9. On one of the primed panels brush a coat of paint conforming to TT-P-1510 or TT-P-19 at a spreading rate of 145 square meters (600 square feet) per gallon. On the other primed panel brush a coat of paint conforming to TT-P-105 at the same spreading rate. Paint one half of the unprimed cedar panel with a paint conforming to TT-P-1510 or TT-P-19 at a spreading rate of 1475 square meters (600 square feet) per gallon, and on the other half, brush a coat of paint conforming to TT-P-105 at the same spreading rate. Allow all three panels to dry at room temperature for 72 hours. Compare the dried films on the three panels and evaluate for compliance with 3.3.9.

4.2.10 Pigment and nonvolatile organic material. Spread thinly approximately 5 grams of well-mixed paint sample over the surface of a tared petri dish of borosilicate glass, approximately 10 centimeters in diameter, and obtain exact total weight. Dry in a vented regular oven at 105 deg. C to constant weight. (This requires overnight drying.) After obtaining the weight of the total nonvolatile material, ash in a muffle furnace, raising temperature gradually to 450-500 deg. C. Allow 2 hours for complete combustion of the organic material. The furnace door should be

opened carefully when removing sample as the remaining pigment is very light and easily scattered. Place sample in desiccator and cool to room temperature. Obtain the weight of the ashed material.

4.2.10.1 Calculations.

Wt. of total nonvolatile material - wt. of ashed material = wt. of nonvolatile organic material

wt. of ash x 100 = pigment, percent by weight of paint
total weight of sample

wt. of nonvolatile organic material x 100 = nonvolatile organic material,
total wt. of sample percent by weight of paint

4.2.11 Lead content. Determine lead content of the primer in accordance with ASTM D 3335 to determine compliance with table I.

4.2.12 Inspection of preparation for delivery. The packaging, packing, and marking shall be inspected to determine conformance to the requirements of section 5 in accordance with PPP-P-1892.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing and marking. The paint shall be packaged, packed, and marked in accordance with PPP-P-1892. The level of packaging shall be level A, B, or C, and the level of packing shall be level A, B, or C, as specified (see 6.2). The paint shall be furnished in 1-gallon metal cans, or 5-gallon steel pails as specified (see 6.2). All containers shall be resin-lined.

5.1.1 Additional marking. Each container shall also contain the following additional identification marking:

Primer coating, Latex-base, Exterior (Undercoat for wood), white and tints.

5.1.1.1 Directions for use. These directions for use shall be legible, and shall be shown on the side opposite that bearing the identification of the paint:

This is a priming paint for previously unpainted exterior woodwork, or for exterior surfaces previously painted with house paint. This priming paint should never be used as a topcoat to be left exposed to the weather for a long time. Suitable topcoat(s) should be applied within a week or two after applying the primer.)

Recommended procedure	For previously unpainted wood	
	Two-coat work	Three-coat work
First coat	Apply the primer as it comes from the container, without any thinning. Use at least 1 gallon for each 450 square feet of surface.	Apply the primer. Thin if necessary according to manufacturer's directions. Use at least 1 gallon for each 450 square feet of surface.

For previously unpainted wood (con't)

Recommended procedure	Two-coat work	Three-coat work
Second coat	Use a suitable solvent-thinned topcoat paint such as TT-P-102, TT-P-105, or MIL-P-52324, or use a suitable water-thinned topcoat paint such as TT-P-1510 or TT-P-19. Apply as directed on the label.	

Third coat	Apply the topcoat paint as directed on the label.
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For repainting

Recommended procedure	One-coat work (Old paint must be in good condition)	Two-coat work (Old paint should be well worn)
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First coat	Use a suitable topcoat paint such as TT-P-102, TT-P-105, MIL-P-52324, or TT-P-1510. Do not use primer.	Apply the primer. Thin if necessary according to manufacturer's directions. Use at least 1 gallon for each 600 square feet of surface.
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Second coat	Use a suitable topcoat paint such as TT-P-102, TT-P-105, MIL-P-52324, TT-P-19, or TT-P-1510.
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6. NOTES

6.1 Intended use. This primer is intended for previously unpainted exterior woodwork or for exterior surfaces previously painted with house paint. It is highly recommended that the primer be of a different color or tint than the top coat paint to assure application of an adequate coating system.

6.2 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Color required (see 3.3.2).
- (c) Level of packaging and level of packing required (see 5.1).
- (d) Quantities to be packaged (see 5.1).

6.3 Unit of purchase. The unit of purchase shall be 1 U.S. gallon which is equal to 3.79 liters (231 cubic inches). Paint temperature shall not be in excess of 20 deg. C (68 deg. F) at time of volume measurements.