Metric
TT-P-25F
January 8, 1992
SUPERSEDING
TT-P-25E
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FEDERAL SPECIFICATION

PRIMER COATING, EXTERIOR (LOW VOC UNDERCOAT FOR WOOD, WHITE AND TINTS)

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal Agencies.

1. **SCOPE AND CLASSIFICATION.** This specification covers a primer coating in white and tints for exterior woodwork and siding with volatile organic compound content of 250 grams per liter (2.08 lb.gal) maximum.

2. **APPLICABLE DOCUMENTS**

2.1 The following specifications and standards, 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 Wood and Masonry)
TT-P-102 - Paint, Oil (Alkyd Modified, Exterior, Low VOC)
TT-T-291 - Thinner, Paint, Mineral Spirits

Federal Standards:

FED-STD-141 - Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing
FED-STD-313 - Material Safety data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities
FED-STD-595 - Colors Used in Government Procurement

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

(Copies of Specifications and Standards required by contractors in connection with specification procurement functions should be obtained from the procuring activity or as 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 185 - Coarse Particles in Pigments, Pastes, and Paints
D 562 - Consistency of Paints Using the Stormer Viscometer
D 1210 - Fineness of Dispersion of Pigment-Vehicle Systems
D 1640 - Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
D 1729 - Visual Evaluation of Color Differences of Opaque Materials
D 1849 - Package Stability of Paint
D 2697 - Volume Nonvolatile Matter in Clear or Pigmented Coatings
D 2805 - Hiding Power of Paints by Reflectometry
D 3273 - Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
D 3274 - Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation
D 3335 - Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy

 FSC 8010

American Society for Testing and Materials (ASTM) Standards:

D 3359 - Measuring Adhesion by Tape Test
D 3624 - Low Concentrations of Mercury in Paint by Atomic Absorption Spectroscopy
D 3960 - Volatile Organic Content (VOC) of Paints and Related Coatings
E 97 - Directional Reflectance Factor, 45-deg, 0-deg, of Opaque Specimens by Broad-Band Filter Reflectometry
E 260 - Packed Column Gas Chromatography

(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 primer coating shall consist of pigment and vehicle so combined as to produce a material meeting all requirements specified herein.

3.1.1 **Prohibited materials.** When tested as specified in table II and 4.3.1, the primer coating shall not contain benzene, chlorinated solvents or ethylene-based glycol ethers and their acetates. Lead content shall not exceed 0.06 percent of the nonvolatile content. Mercury and hexavalent chromium compounds shall not be used.

3.2 **Qualitative requirements.**

3.2.1 **Condition in container.** A freshly opened container of primer coating tested as in Table II shall be free from grit, seeds, skins, lumps, or thickening and shall show no more pigment settling or caking than can be readily reincorporated by hand-stirring with a paddle to a smooth homogeneous state.

3.2.2 **Skinning.** The primer coating shall show no skinning after 48 hours when tested as specified in table II.

3.2.3 **Accelerated-storage stability.** After storage at 52°C (125°F) for 30 days, as specified in table II, a sealed, filled one-quart can of primer coating shall show no skinning, seeding, pigment agglomerates or pigment that cannot be redispersed with a spatula by hand-stirring for one minute. The primer coating shall be dispersible to a uniform condition and shall pass the brushing properties test specified in 3.2.5.

3.2.4 **Color.** When tested as specified in table II at complete hiding the color of the tinted primer coating shall be a general match to the color specified.

3.2.5 **Brushing properties.** The primer coating when tested as in 4.3.2 shall be capable of being brushed out without brush drag. When dry, the brushed surface shall be free from sags and runs and shall show a minimum of brush marks. A second coat shall show no lifting or other film irregularities.

3.2.6 **Spraying properties.** The primer coating when tested as in 4.3.4 shall spray satisfactorily without running, sagging or streaking. The dried film shall show no dusting, mottling or color separation.

3.2.7 **Flexibility.** When tested as in 4.3.5, the primer coating film shall not crack or flake.

3.2.8 **Adhesion.** The primer coating when tested as in 4.3.6 shall achieve a rating of 3A to 5A.

3.2.9 **Biological growth.** When tested as specified in table II, the primer coating shall attain a surface disfigurement rating of 8 or greater when evaluated against Adjunct No. 12-432740-00 specified in ASTM D 3274.

3.2.10 **Sealing properties.** When tested as specified in 4.3.7, the dried film shall be uniform in appearance and shall exhibit a smooth finish free from suction spots, flashes, and fuzz. When top coated as specified in 4.3.7, the top coat shall be uniform in appearance and gloss.

3.2.11 **Water resistance.** A film of the primer coating tested as in 4.3.8 shall show no checking, wrinkling or blistering immediately after removal from the water and after 2 hours recovery shall show no difference in hardness or color when compared with the portion of the film which was not immersed.

3.3 **Quantitative requirements.** The primer coating shall comply with all requirements in table I.

TABLE I. Quantitative requirements		
Characteristics	Min	Max
Total solids, percent by volume of primer	65	--
Coarse particles and skins (retained on No. 325 sieve), percent by weight of pigment	--	1.0
Fineness of grind (Hegman scale)	4.0	--
Consistency, Krebs-Stormer, (200 rpm shearing rate) Equivalent K.U.		
As packaged	75	90
Reduced	--	70
Drying time, set-to-touch, hours	1/2	4
Dry hard, hours	--	18
Directional reflectance, White only	80	--
Contrast ratio at 12 M^2/L (500 ft^2/gal)		
Reflectivity 80 and above	0.94	--
76 - 79	0.95	--
72 - 75	0.96	--
68 - 71	0.97	--
61 - 67	0.98	--
60 and lower	0.99	--
Volatile organic compound (VOC) content (after thinning),(less water and exempt solvents) Grams/liter (lb/gal)	--	250 (2.08)

3.4 **Material Safety Data Sheet.** A material safety data sheet (MSDS) shall be prepared and submitted in accordance with FED-STD-313.

4. QUALITY ASSURANCE PROVISIONS

4.1 **Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements specified herein using facilities approved by the Government. The Government reserves the right to perform any of the inspections set forth herein when deemed necessary to assure that the primer coating conforms to prescribed requirements.

4.2 **Classification of inspections.** Inspections shall be classified as follows:

(a) Quality conformance inspection (see 4.3).

(b) *Inspection of preparation for delivery (see 4.2.1*

4.2.1 **Preparation for delivery.** A random sample of filled containers shall be selected in accordance with MIL-STD-105, inspection level S-2, acceptable quality level (AQL) 2.5 percent defective, and examined for compliance with 3.4 and section 5.

4.3 ***Quality conformance inspection.*** The primer coating shall be tested in accordance with the methods specified in Table II and as otherwise specified herein to determine compliance with the requirements of section 3. Unless otherwise specified, all tests shall be conducted at conditions specified in section 9 of FED-STD-141. Failure of any test requirement shall be cause for rejection of the lot from which the sample was taken.

TABLE II. Index of tests				
Characteristic	Requirement Paragraph	Test Paragraph	ASTM Method	FED-STD-141 Method
Prohibited materials				
Solvents	3.1.1	—	E 260	—
Lead	3.1.1	4.3.1.1	D 3335	—
Hexavalent Chromium	3.1.1	4.3.1.2	—	—
Mercury	3.1.1	—	D 3624	—

TABLE II. Index of tests (Continued)

Characteristic	Requirement Paragraph	Test Paragraph	ASTM Method	FED-STD-141 Method
Condition in container	3.2.1	—	—	3011
Skinning	3.2.2	—	—	3021
Accelerated-storage stability	3.2.3	—	D 1849	—
Color 3.2.4	–	D 1729	—	
Brushing properties	3.2.5	4.3.2	—	4321
Spraying properties	3.2.6	4.3.4	—	4331
Flexibility	3.2.7	4.3.5	—	6221
Adhesion	3.2.8	4.3.6	D 3359	—
Biological growth	3.2.9	—	D 3273 D 3274	—
Sealing properties	3.2.10	4.3.7	—	—
Water resistance	3.2.11	4.3.8	—	—
Total Solids (Volume)	Table I	—	D 2697	—
Coarse particles and skins	Table I	—	D 185	—
Fineness of grind	Table I	—	D 1210	—
Consistency (Package)	Table I	—	D 562	—
Consistency (Reduced)	Table I	4.3.3	D 562	—
Drying time	Table I	—	D 1640	—
Directional reflectance	Table I	—	E 97	—
Contrast ratio	Table I	—	D 2805	—
Volatile organic compound content	Table I	4.3.3	D 3960	—

4.3.1 **Prohibited materials.**

4.3.1.1 **Lead content.** Determine lead content in accordance with ASTM D 3335 or by the use of an xray fluorescence spectrometer capable of determining lead at a minimum range of 0.03 through 1.0 percent mass of non-volatile with an accuracy within plus or minus 5.0 percent. The Xray method shall be used in case of dispute.

4.3.1.2 **Hexavalent chromium content.** Add 5 mL 25 percent aqueous KOH to 1/2 gram extracted pigment in a centrifuge tube. Agitate by shaking and centrifuge. A yellow color in the supernatant liquid indicates the presence of hexavalent chromium.

4.3.2 **Brushing.** Determine the brushing properties in accordance with method 4321 of FED-STD-141 except using wood panels prepared in accordance with method 2031 of FED-STD-141 paragraphs 2.1.1, 2.1.2, and 2.1.3 for compliance with 3.2.5. After 48 hours air drying, similarly brush a second coat over the panel and evaluate for compliance with 3.2.5.

4.3.3 **Consistency (reduced).** Reduce eight parts, by volume, of the primer coating with one part, by volume, of thinner TT-T-291, type I. Determine consistency in accordance with ASTM D 562 and volatile organic content in accordance with ASTM D 3960 for compliance with table I.

4.3.4 **Spraying.** Reduce the primer coating as in 4.3.3. Spray on wood panels (see 4.3.7) to a dry film thickness of 25 + 2 micron (0.001 ± 0.0001 inch) and observe for spraying properties in accordance with method 4331 of FED-STD-141. Evaluate for compliance with 3.2.6.

4.3.5 **Flexibility.** Prepare the test panel in accordance with method 2012, FED-STD-141. Supplement the panel cleaning with an additional cleaning with abrasive soap so that the surface shows no water break. Draw down the primer coating on the clean, dry panel with a film applicator to obtain a dry-film thickness of 25 ± 2 microns (0.001 ± 0.0001 inch). Air dry 18 hours, bake at 105 ± 2°C (221 ± 4°F) for 3 hours, and cool 1/2 hour at room temperature. Bend over a 3.18 mm (1/8 inch) diameter cylindrical mandrel and examine under a magnification of 7 diameters in accordance with method 6221, FED-STD-141.

4.3.6 **Adhesion (tape method).** Perform the tape test in accordance with ASTM D 3359, method A on the panel from the flexibiltiy test above. Observe for compliance with 3.2.8.

4.3.7 **Sealing properties.** Prepare two western red cedar panels 125- by 350-mm (5- by 18-inches) cut from lumber of the quality known as grade A select. Brush a film of the primer coating on the panels at spreading rate of 11 M^2/L (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 3.4.11. Brush a coat of tinted paint conforming to TT-P-19 on one of the primed panels at spreading rate of approximately 11 M^2/L (450 square feet per gallon). On the other primed panel brush a coat of tinted paint conforming to TT-P-102 at the same spreading rate. Compare the dried films and evaluate for compliance with 3.2.10.

4.3.8 **Water resistance.** Brush a coat of primer coating at a spreading rate of 11 M^2/L (450 square feet per gallon) on a clean steel panel and allow to dry for 72 hours. Immerse 2-inches in distilled water at 25°C for 18 hours. Examine immediately after removal and after 2 hours recovery time for compliance with 3.2.11.

5. PREPARATION FOR DELIVERY

5.1 **Packaging, packing and marking.** The primer coating shall be furnished in quantities specified (see 6.2). The packaging, packing and marking shall be as specified (see 6.2).

6. NOTES

6.1 **Intended use.** This primer coating is intended for previously unpainted exterior woodwork or for exterior surfaces previously painted with house paint.

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.
(c) Quantities required.
(d) Packaging, packing and marking required.
(e) Instructions and address for MSDS submission.

6.3 Key word listing:

Primer
Undercoat

MILITARY INTEREST

Custodians:
Air Force - 99

Review activities
Air Force - 69
Army - AT
User activities
Marines - MC

CIVIL AGENCY COORDINATION ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

GSA - FSS

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