TT-P-001957
May 15, 1984

INTERIM FEDERAL SPECIFICATION

PAINT, LATEX (BACTERIOSTATIC AND FUNGISTATIC)

This interim Federal Specification was developed by the General Services Administration, Office of Federal Supply and Services, 10FCE, Auburn, WA 98001, based upon currently available technical information. It is recommended that federal agencies use it in procurement and forward recommendations for change to the preparing activity at the address shown above.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers a latex-base coating with bacteriostatic and fungistatic properties for exterior and interior applications.

1.2 Classification. The paint covered by this specification shall be a high-hiding white suitable for tinting in the following types:

Type I - Flat for interior use
Type II - Semi-gloss for interior use
Type III - Gloss for interior use
Type IV - Exterior

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

TT-T-390 - Tinting Medium, Concentrate, General-Purpose

PPP-P-1892-Paint, Varnish, Lacquer, and Related Materials; Packing and Marking of

Federal Standards:

Federal Test Method Standard No. 141 - Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing.

Military Standards:

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

(Copies of specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

ENVIRONMENTAL PROTECTION AGENCY (EPA) 40 CFR 164

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

(Application for copies should be addressed to the Environmental Protection Agency, Office of Pesticide Programs, Registration Division, Washington, DC 20460.)

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 the date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

D 523 - Specular Gloss
D 562 - Consistency of Paint Using the Stormer Viscometer
D 1210 - Fineness of Dispersion of Pigment-Vehicle Systems
D 1296 - Odor of Volatile Solvents and Diluents
D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes
D 2243 - Freeze-thaw Resistance of Latex and Emulsion Paints
D 2369 - Volatile Content of Paints
D 2486 - Scrub Resistance of Interior Latex Flat Wall Paints
D 2805 - Hiding Power of Paints
D 3273 - Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
D 3335 - Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
D 3450 - Washability Properties of Interior Architectural Coatings
D 3960 - Volatile Organic Content (VOC) of Paints and Related Coatings
E 84 - Surface Burning Characteristics of Building Materials
E 97 - 45-deg, 0-deg Directional Reflectance of Opaque Specimens by Filter Photometry
G 23 - Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water For Exposure of Non Metallic Materials

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

3. REQUIREMENTS

3.1 Materials. The paint shall be ready-mixed and shall consist of pigment, latex, and additives so combined to meet the requirements of this specification.

3.1.1 Volatile organic content. Volatile organic content of the paint shall not exceed 250 grams per liter when tested as in table II.

3.2 Qualitative requirements.

3.2.1 Condition in container. When tested as in table II, the paint as received shall show no evidence of biological growth, livering, skinning, corrosion of the container, or hard settling of the pigment. Any settled pigment shall be easily dispersible by hand stirring with a paddle to form a smooth homogeneous paint, free from persistent foam.

3.2.2 Odor. The odor of the paint shall not be offensive or irritating before, during, or after application when tested as in table II. There shall be no residual odor after 24 hours air drying.

3.2.3 Flexibility. When tested as in 4.3.1, the paint film shall withstand bending without cracking or loss of adhesion.

3.2.4 Working properties. When tested as in 4.3.2, the paint shall be easily applied by brush, roller, and spray; and shall dry to a smooth uniform film, free from lap marks, streaks, dusting, mottling, orange peel, pinholes, craters, or fisheyes.

3.2.5 Washability. When tested as in 4.3.3, the staining medium shall be substantially removed without any exposure of the substrate. The reflectance of the cleaned area shall be not less than 90 percent of the value measured before testing and the 60 degree specular gloss shall be not less than 70 percent nor more than 120 percent of the original gloss.

3.2.6 Scrub resistance. When tested as in 4.3.4, the paint film shall not be worn through to the panel in less than 2,000 cycles for type I paint or less than 3,000 cycles for types II, III and IV.

3.2.7 Freeze-thaw resistance. When tested as in table II, the consistency shall not change more than 5 KU. After completion of the test the paint shall dry to a smooth uniform film when applied by brush.

3.2.8 Alkali resistance. When tested as in 4.3.5, the film shall show no blistering or re-emulsification immediately after testing. After 24 hours recovery, the film shall show no change in hue, lightness, or gloss.

3.2.9 Fungus resistance. The paint shall have a surface disfigurement rating of eight or greater when tested as in table II.

3.2.10 Resistance to bacterial growth. When tested as in 4.3.6, the paint film shall not support bacterial growth.

3.2.11 Compatibility. When tested as in 4.3.7, the dried film shall show uniform color and the 60 degree specular gloss shall be within the limits of table I for the appropriate type.

3.2.12 Accelerated weathering (Type IV only). When tested as in 4.3.8, the paint film shall show no chalking, the 60° specular gloss shall not change more than 10 percent from the initial value, and the lightness index difference shall not be greater than 1.5.

3.2.13 Flame test. The manufacturer's formulation shall have been tested by an independent laboratory in accordance with ASTM E 84 and shall have obtained ratings of 0 for flamespread, fuel contributed, and smoke development. The supplier shall certify that the paint offered under this specification is identical within manufacturing limits to that tested.

3.2.14 EPA registration. Paint supplied under this specification shall be registered with the Environmental Protection Agency as a pesticide for fungus and bacteria.

3.2.15 Labelling. Each container of paint shall be labelled with an Environmental Protection Agency approved label.

3.3 Quantitative requirements. The quantitative requirements shall be as specified in table I.

TABLE I. Quantitative requirements

Characteristics	Requirements Min	Max
Nonvolatile, percent by weight of paint	45	—
Fineness of dispersion, Types I and IV	3	—
Types II and III	6	—
Consistency, Krebs-Stormer, K.U.	75	100
Drying time		
Set-to-touch, minutes	10	20
Dry hard, hours	—	6
60° specular gloss		
Type I		10
Type II	40	60
Type III	70	—
Directional reflectance	90	—
Hiding power, square meters per liter	12.3	—
(square feet per gallon)	(500)	
Lead, percent by weight of nonvolatile	—	0.06

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 specified herein.

4.2 Examination of preparation for delivery. An examination shall be made to determine compliance with the requirements of paragraph 3.2.15 and section 5. The sample unit shall be one shipping container fully prepared for delivery. Sampling shall be in accordance with MIL-STD-105. The inspection level shall be S-2 with an AQL of 4.0 expressed in terms of percent defective.

4.3 Test procedures. The paint shall be tested as indicated in table II or as otherwise specified herein. Test conditions shall be as specified in Section 9, Federal Test Method Standard No. 141. Failure to pass any test, or noncompliance with any requirement, shall be cause for rejection of the sample.

TABLE II. Index

Characteristics	Requirement Reference	Test Methods: Federal Test Method Standard No. 141	Test Methods: ASTM Method	Paragraph Reference
Volatile organic matter	3.1.1	--	D 3960	--
Condition in container	3.2.1	3011	--	--
Odor	3.2.2	--	D 1296	--
Flexibility	3.2.3	6221	--	4.3.1
Working Properties	3.2.4	--	--	4.3.2
Washability	3.2.5	--	D 3450	4.3.3
Scrub resistance	3.2.6	--	D 2486	4.3.4
Freeze-thaw resistance	3.2.7	--	D 2243	--
Alkali resistance	3.2.8	--	D 1308	4.3.5
Fungus resistance	3.2.9	--	D 3273	--
Bacterial growth	3.2.10	--	--	4.3.6
Compatibility	3.2.11	--	--	4.3.7
Accelerated weathering	3.2.12	--	G 23	4.3.8
Nonvolatile	Table I	--	D 2369	--
Fineness of dispersion	Table I	--	D 1210	--
Consistency	Table I	--	D 562	--
Drying time	Table I	4061	--	--
60° specular gloss	Table I	--	D 523	4.3.9
Directional reflectance	Table I	--	E 97	--
Hiding power	Table I	--	D 2805	--
Lead	Table I	--	D 3335	4.3.10

4.3.1 Flexibility. Prepare the test panel in accordance with method 2012 of Federal Test Method Standard 141. Supplement the panel cleaning with an additional cleaning with abrasive soap so that the surface shows no water break. Drawn down the paint on the clean, dry panel with a 152 + 2 um (0.006 ± 0.0001 inch) gap clearance film applicator. Air dry 18 hours at 23° + 1°C (73° + 2°F) and 50 ± 4 percent relative humidity, bake 3 hours at 40° + 1°C (105° + 2°F), and cool 1/2 hour at room temperature. Bend over a 3.2 -mm (1/8 inch) diameter mandrel and examine in accordance with method 6221 of Federal Test Method Standard No. 141.

4.3.2 Working properties. Apply the paint at a spreading rate of approximately 11 m^2/L (450 ft^2/gal) with a 4-inch synthetic filament brush, a synthetic filament medium pile roller, and by spraying to primed gypsum wallboard. Air dry 24 hours and evaluate for compliance with 3.2.4.

4.3.3 Washability. Determine washability in accordance with ASTM D 3450 for compliance with 3.2.5, except that the nonabrasive medium shall be used.

4.3.4 *Scrub resistance*. Determine scrub resistance in accordance with ASTM D 2486 except:

1. Use a sponge with dimensions of 95 by 73 by 38 mm (3-3/4 by 2-7/8 by 1-1/2 inches) when wet. The direction of least compressibility shall be in the 38 mm (1-1/2 inch) dimension. Soak the sponge 30 minutes in distilled water at 23° + 1°C (73° + 2°F), squeeze dry with maximum hand pressure, and evenly distribute 50 ml of distilled water over the surface of the sponge. Do not wet the panel with additional water. Spread 10 g of the specified scrub medium evenly over the wearing surface of the sponge. Recharge the sponge with 10 g of scrub medium after each 100 cycles.

2. Use a holder weighing 454 g (1.0 lb) suitable for holding the sponge. The apparatus used shall have a stroke length of 380 mm (15.0 in).

4.3.5 Alkali resistance. A panel prepared and dried as in paragraph 4.3.4 above shall be tested in accordance with paragraph 6.2, ASTM D 1308 using 0.5 percent NaOH for 4 hours contact time. Evaluate for compliance with 3.2.8.

4.3.6 Resistance to bacterial growth. Brush the paint on 18-mm square glass cover slips and air dry 48 hours. Use 60-mm diameter petri dishes containing 15.0 ml Tryptone Glucose Extract agar with 1.5 ml of 24 hour broth cultures of bacteria in 150 ml of Tryptone Glucose Extract agar. Test the paint separately in triplicate against Staphylococcus aureas (ATCC 6538) and Pseudomonas aeruginosa (ATCC 10145). Place the painted surface in contact with the agar and incubate 24 hours at 30°C (86°F) and 90 percent relative humidity. Evaluate for compliance with 3.2.10.

4.3.7 Compatibility. Thoroughly mix 100 g of paint with 2.0 g of tinting medium concentrate conforming to color 1a of TT-T-390. Allow to stand undisturbed 5 minutes. Brush a coat of the mixture to a dry film thickness of approximately 38 um (0.0015 inch) on a clean glass panel and dry vertically 24 hours at room temperature. While brushing, observe for streaks and pigment separation. While the paint is still wet, rub an area using the index finger in a circular motion for 20 revolutions. Exert light pressure so as not to rub off the film. Examine the dried film and compare the rubbed area with the unrubbed area. A difference in color or 60° specular gloss between these areas shall constitute incompatibility. Evaluate for compliance with 3.2.11.

4.3.8 Accelerated weathering.

4.3.8.1 Panel preparation. Draw down duplicate films on tinplate panels to a dry film thickness of 38 + 2 um (0.0015 + 0.0001 inch). Air dry 168 hours, measure 60° specular gloss in accordance with ASTM D 523, and directional reflectance in accordance with ASTM E 97.

4.3.8.2 Exposure. Expose the panels to 300 hours accelerated weathering in accordance with ASTM G 23, type D, using the exposure cycle in paragraph 5.2 of the method.

4.3.8.3 Evaluation. Examine the exposed panels for chalking in accordance with ASTM D 659 using a black velvet cloth. Measure the 60° gloss and directional reflectance as above and calculate the average percentage loss of gloss and the lightness index difference in accordance with method 6122 of Federal Test Method Standard No. 141.

4.3.9 *60° specular gloss. Draw down the paint on plane*, opaque, white glass panels specified in 2.1.5 of method 2021 of Federal Test Method Standard No. 141. Use a film applicator which will produce a wet film thickness of 76 + 2 um (0.003 + 0.0001 inch). Determine 60° specular gloss in accordance with ASTM D 523 after 48 hours drying at 23° + 1°C (73° + 2°F) and 50 + 4 percent relative humidity.

4.3.10 Lead content. Determine lead content in accordance with ASTM D 3335 or as specified below. In case of dispute, the following procedure shall be used.

4.3.10.1 Sample preparation. Draw down the paint on standard penetration charts using a 152 um (0.006 inch) gap clearance film applicator and air dry 24 hours.

4.3.10.2 Procedure. Lead content shall be determined using an X-ray fluorescence spectrometer capable of determining lead at a level of 0.03 percent by weight of non-volatile. The settings for a wavelength dispersive fluorescence spectrometer shall be:

Element	Analytical Line	Angle	Crystal	Detection	Collimator	X-ray tube (MO)
Pb	L	33.93	LiF(200)	Flow S.C.	Fine	60 kV 45 mA
Pb (Background I)		33.00	LiF(200)	Flow S.C.	Fine	60 kV 45 mA
Pb (Background II)		35.50	LiF(200)	Flow S.C.	Fine	60 kV 45 mA
Mo	K	20.33	LiF(200)	Flow S.C.	Fine	60 kV 45 mA

Pulse height selection shall be used in all measurements, and counting time shall be 100 seconds. Place the sample in the wavelength dispersive unit. Measure the count rates of lead, lead background, and the molybdenum compton scattered background from the X-ray tube.

4.3.10.3 Calculation.

$$R = \frac{2\,I_{Pb} - I_{Pb}(I) - I_{Pb}(II)}{2\,I_{Mo}}$$

Where I equals gross intensity. These results shall be compared to those obtained using a 0.06 percent lead standard made up from the same type of paint, and evaluated for compliance with table I.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing, and marking. The paint shall be furnished in quantities as specified (see 6.2). The packaging, packing, and marking shall be in accordance with PPP-P-1892. The level of packaging shall be A,B, or C unless otherwise specified (see 6.2). The level of packing shall be A, B, or C unless otherwise specified (see 6.2). The marking shall be civil or military unless otherwise specified (see 6.2).

6. NOTES

6.1 Intended use. Paint covered by this specification is intended for use in areas where bacteriostatic and fungistatic properties are required.

6.2 Ordering data. Purchasers should include the following information in procurement documents.

(a) Title, number, and date of this specification.
(b) Type required (see 1.2).
(c) Packaging,packing, and marking required.
(d) Size of container required.

6.3 Cultures of the organisms used in fungus and bacteria resistance tests may be obtained from the American Type Culture Collection, 12301 Parklawn Drive, Rockville, MD 20852.

PREPARING ACTIVITY:

GSA - FSS