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TT-E-506K
July 6, 1977
SUPERSEDING
Fed. Spec. TT-E-506J
April 9, 1973

FEDERAL SPECIFICATION

ENAMEL, ALKYD, GLOSS, TINTS AND WHITE (FOR INTERIOR USE)

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

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers two types of an alkyd-type, full-gloss enamel suitable for interior use on walls, ceilings, and wood-work.

1.2 Classification. The enamel under this specification shall be of the following types:

Type I - Tints (pastel) and whites (colors 17875 and 17778) specified by reference to Fed. Std. No. 595.

Type II - A high-hiding white (no color number) suitable for use as is or as a tint-base (see 3.2 and 6.5).

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:

SS-L-30	-	Lath, and Board Products, Gypsum.
TT-E-508	-	Enamel; Interior, Semigloss, Tints and White.
TT-E-543	-	Enamel-Undercoat, Interior, Tints and White.
TT-P-650	-	Primer Coating, Latex Base, Interior, White (for Gypsum Wallboard).
TT-P-266	-	Resin, Alkyd Solutions.
TT-S-735	-	Standard Test Fluids; Hydrocarbon.
TT-T-291	-	Thinner, Paint, Volatile Spirits (Petroleum Spirits).
TT-T-390	-	Tinting Medium, Concentrate General-Purpose.
LLL-B-1188	-	Building Board, Hard Pressed Vegetable Fiber (Laminated).

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Federal Standards:

Fed. Std. No. 123 - Marking for Shipment (Civil Agencies).
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, Philadelphia, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Houston, 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 Standard:

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

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

Laws and Regulations:

49 CFR 178 - Department of Transportation (DOT) Shipping Container Specifications.

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

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.

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification.

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(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

American Society for Testing and Materials (ASTM) Standards:

D 476	-	Titanium Dioxide Pigments.
D 562	-	Consistency of Paints Using the Stormer Viscosimeter.
D 563	-	Phthalic Anhydride Content of Alkyd Resins and Resin Solutions.
D 1210	-	Fineness of Dispersion of Pigment Vehicle Systems.
D 1308	-	Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
D 1542	-	Qualitative Tests for Rosin in Varnishes.
D 3272	-	Vacuum Distillation of Solvents from Solvent-Based Paints for Analysis.
E 97	-	45 deg., 0 deg. Directional Reflectance of Opaque Society by Filter Photometry.

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

3. REQUIREMENTS

3.1 Composition.

3.1.1 Pigments. The prime pigment shall consist of titanium dioxide conforming to ASTM D 476, types III or IV. Zinc oxide is permitted at the discretion of the supplier, provided the enamel complies with all requirements. Tinting pigments may be used when necessary to match the color required, provided these pigments have food color permanence when tested as specified in table III.

3.1.2 Vehicle. The vehicle shall consist of alkyd resin solutions conforming to TT-R-266, type I. Driers, wetting agents, coalescing agents, or suspension agents may be used at the discretion of the supplier.

3.1.3 Solvent. The solvent, when tested as specified in 4.3.16, shall conform by volume to the following requirements:

(a) Aldehydes or branched-chain ketones: 20 percent maximum.

(b) Aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent maximum.

(c) Ethylbenzene or toluene: 20 percent maximum.

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(d) Solvents with olefinic or cyclo-olefinic unsaturation: 5 percent maximum

(e) Total of (a) + (b) + (c) + (d) = 20 percent maximum.

(f) Benzene: Benzene shall not be used in this product. A trace level of 0.01 percent maximum is allowed for benzene as an impurity in other solvents.

(g) Halogenated hydrocarbons: Zero.

3.2 Color. The color of all type I paint specified in the contract or order (see 6.2) shall match that of the standard color chip in Fed. Std. No. 595 when tested as specified in 4.3.1). Type II (tint-base) shall meet the directional reflectance specified in table I when tested as specified in table V.

3.3 Qualitative requirements.

3.3.1 Condition in container. The enamel, when tested as specified in 4.3.1, shall be free of grit, seeds, skins, lumps, and livering, and shall show no more pigment settling or caking than can readily be reincorporated to a smooth homogeneous state.

3.3.2 Storage stability.

3.3.2.1 Partially full container. The enamel shall show no skinning when tested in 4.3.3. After storage as specified in 4.3.2.1, the enamel shall show no livering, seeding, curdling, hard caking, or gummy sediment. It shall mix readily to a smooth homogeneous state.

3.3.2.2 Full container. The enamel shall show no skinning, livering, seeding, curdling, hard and dry caking, or tough gummy sediment when tested as in 4.3.2.2. After storage for 12 months as specified in 4.3.2.2, the enamel shall remix readily to a smooth homogenous state, there shall be no change in drying time, and the viscosity shall be between 72 and 91 K.U.

3.3.3 Dilution stability. When thinned as specified in 4.3.3. the enamel shall remain stable and uniform, showing no precipitation, curdling, or separation.

3.3.4 Brushing properties. The enamel, when tested as specified in 4.3.4, shall dry to a smooth, glossy uniform film free from seeds, runs, and streaks. The dried film shall be free of brush marks.

3.3.5 Spraying properties. The enamel, when tested as specified in 4.3.5 shall show no running, sagging, streaking, or pronounced orange peel. The air-dried film shall show no seeding, dusting, floating, flagging, mottling, or hazing.

3.3.6 Compatibility (type II only). When tested as specified in 4.3.14 the dried film shall show uniform color, a 60 deg. gloss between 80 and 87, and no streaks, craters, or pigment floating.

3.3.7 Flexibility. A film of the enamel, prepared and tested as specified in 4.3.7, shall withstand bending without cracking or flaking.

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3.3.8 Knife test. A film of enamel, prepared and tested as specified in 4.3.8, shall adhere tightly to and shall not flake or crack from the metal. The film ribbon shall curl when cut from the metal, and the cut shall show beveled edges.

3.3.9 Recoating properties. When tested as specified in 4.3.9, recoating of a dried film shall produce no flashing, lifting, mottling, orange peeling, spotting, or wrinkling.

3.3.10 Hydrocarbon resistance. A film of the enamel prepared and tested as specified in 4.3.10, shall show no blistering or wrinkling when examined immediately after removal from the test fluid. When examined 2 hours after removal, there shall be no softening, whitening, or dulling. After 48 hours air drying, the portion of the panel which was immersed shall be the same with regard to hardness, adhesion and general appearance as the unimmersed portion, and it shall retain at least 75 percent of the 60 deg. specular gloss of the unimmersed portion.

3.3.11 Sag resistance. When tested as specified in 4.3.11, the enamel shall have a minimum anti-sag index of 7.0.

3.3.12 Water resistance. A film of the enamel, prepared and tested as specified in 4.3.12, shall show no blistering or wrinkling when examined immediately after removal from distilled water. When examined 2 hours after removal, there shall be no softening or dulling. After 24 hours of air drying, the portion of the panel which was immersed shall be the same with regard to hardness, adhesion, and general appearance of the unimmersed portion, and it shall retain at least 90 percent of the 60 deg. specular gloss of the comparison portion.

3.3.13 Leveling properties. The enamel shall have a minimum leveling index of 5 when tested as specified in 4.3.13.

3.4 Quantitative requirements. The quantitative requirements shall be as specified in table 1.

TABLE I. Quantitative requirements

Characteristics	Requirements Minimum	Maximum
Pigment, Percent by weight of enamel	32	38
Pigment volume, percent of pigment in total nonvolatile	22	28
Nonvolatile vehicle, percent by weight of vehicle	50	----
Phthalic anhydride, percent by weight of nonvolatile vehicle	23	----
Rosin and rosin derivatives	----	0
Water content, percent by weight of enamel	----	0.5
Coarse particles and skins, residue retained on #325 percent by weight of enamel	----	0.1
Consistency, Krebs-Stormer, Shearing rate, 200 RPM:		
Grams	175	225
Equivalent K.U.	77	86

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TABLE I. Quantitative requirement (con't)

Characteristics	Requirements Minimum	Maximum
Drying time of enamel:		
Set touch (hours)	0.5	2
Dry hard (hours)	----	16
60-Degree specular gloss:		
After 48 hours air drying	87	----
After 168 hours air drying	80	----
Fineness of grind	7	----
Directional reflectance, 45 deg., 0 deg. (type II only)		90
Absorption, mm	----	4
Washability characteristics after tests:		
a. Reflectance, percent of that measured prior to washing	98	----
b. Gloss, percent of that measured prior to washing	70	----
Yellowness index difference (after accelerated yellowing), (type I, only color 17875; and type II)	----	0.10
Lead (as lead metal), percent by weight of total non-volatile matter	----	0.06

3.5 Hiding power (contrast ratio). When tested as specified in table III, not more than 7.0 ml per square foot (540 square feet per gallon) of enamel shall be required to give the contrast ratio specified in table II.

TABLE II. Minimum dry film contrast ratio

Apparent reflectivity percent	Contrast ratio
82 and above	.95
76 - 81	.96
72 - 75	•97
68 - 71	.98
61 - 67	.99
60 and lower	1.00

Reflectances below 60 are not contemplated under this specification. However, if a need for such a tint should arise, the minimum TiO_2 content requirement may be decreased to obtain those colors whose reflectances are below 60; provided the contrast ratio of the resulting color is 1.00.

3.6 Quantities. The enamel shall be furnished in l-quart, l-gallon, and 5-gallon quantities.

4. QUALITY ASSURANCE PROVISIONS

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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 as specified herein. Except as otherwise specified in the contract or order, the contractor 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.

4.2.1 Inspection of preparation for delivery. An inspection shall be made to determine whether the packaging, packing, and marking comply with the requirements of section 5. Defects shall be scored in accordance with table III. The sample unit shall be one shipping container fully prepared for delivery and selected at random. Sampling shall be in accordance with MIL-STD-105. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be C-2 with an AQL of 4.0 defects per hundred units.

TABLE III. Classification of preparation for delivery defects.

Examine	Defects
Markings	Omitted incorrect; illegible; improper size, location, sequence, or method of application.
Material	Any component missing or damaged or wrong type.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strapping, inadequate stapling, or distortion of container.

4.2.2 Lot. The enamel shall be assembled into lots as specified in MIL-STD-105. In MIL-STD-105, the words "essentially the same conditions" shall be interpreted to mean a manufacturer’s batch which is defined as the end product of all raw materials mixed, blended, or processed in a single operation.

4.2.3 Sampling of the end item. For the purposes of sampling, the lot shall be expressed in units of gallons. Samples from lots shall be taken in accordance with MIL-STD-105 using inspection level 5-2 and an acceptable quality level (AQL) of 2.5.

4.2.4 Certificate of compliance. The contractor shall submit to the contracting officer a certificate of compliance indicating that the enamel complies with the storage stability requirement as specified in 3.3.3.2. When certificates of compliance are submitted, the Government reserves the right to test such items to determine the validity of the certificate.

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4.3 Test procedures. The enamel shall be tested according to the test methods indicated in table IV. Unless otherwise specified, standard testing conditions are a temperature of 23 deg. +/- 1 deg. C (73 deg. +/- 2 deg. F) and a relative humidity of 50 +/- 5 percent. All test reports shall contain the individual values utilized in expressing the final result. All tests shall be evaluated for conformance to the requirements specified in section 3. Failure to pass any test, or noncompliance with any requirement, shall be cause for rejection of the sample.

TABLE IV. Index

Characteristics	Requirement Reference	Applicable Tests Fed. Test Method Std. No. 141	ASTM Methods	Paragraph Reference
Condition in container	3.3.1	3011	-----	4.3.1
Storage stability	3.3.2	----		4.3.2
Partially full container	3.3.2.1	3021	-----	4.3.2.1
Full container	3.3.2.2	3022	-----	4.3.2.2
Dilution stability	3.3.3	4203	-----	4.3.3
Brushing property	3.3.4	4321	-----	4.3.4
Spraying property	3.3.5	4331	-----	4.3.5
Compatibility	3.3.6	----	-----	4.3.6
Flexibility	3.3.7	6221	-----	4.3.7
Knife test	3.3.8	6304	-----	4.3.8
Recoating property	3.3.9	4061	-----	4.3.9
Hydrocarbon resistance	3.3.10	6011	-----	4.3.10
Sag resistance	3.3.11	----	-----	4.3.11
Water resistance	3.3.12	----	D 1308 Sec. 5D	4.3.12
Leveling properties	3.3.13	----	-----	4.3.13
Pigment	Table I	----	D 476	------
Pigment volume	Table I	4311	-----	------
Nonvolatile vehicle	Table I	4053	-----	------
Phthalic anhydride	Table I	----	D 563	------
Rosin and derivatives	Table I	----	D 1542	------
Water content	Table I	4081	-----	------
Coarse Particles	Table I	4091	-----	------
Consistency	Table I	----	D 562	------
Drying time	Table I	4061	-----	------
Gloss	Table I	6101	-----	------
Fineness of grind	Table I	----	D 1210	------
Directional reflectance	Table I	----	E 97	------
Absorption	Table I	4421	-----	------
Washability	Table I	6141	-----	------
Yellowness, accelerated	Table I	6132	-----	------
Lead content	Table I	----	-----	4.3.14
Lightfastness of pigments	3.1.1	4561	-----	------
Solvent composition	3.1.3	7360, 5132	D 3272	4.3.15
Color	3.2	4250	-----	4.3.16
Hiding power	3.5	4121	-----	------

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4.3.1 Condition in container. Determine the package condition of the enamel in accordance with method 3011 of Fed. Test Method Std. No. 141, and evaluate for compliance with 3.3.1. Reseal and agitate the can for 3 minutes on a paint shaker On re-examination of the contents, the disclosure of gel bodies, undispersed pigment, or unsatisfactory settling properties shall be cause for rejection.

4.3.2 Storage stability.

4.3.2.1 Partially full container. Determine skinning after 48 hours in accordance with method 3021 of Fed. Test Method Std. No. 141, except use a 3/4-filled 1/2-pint, multiple friction-top can. Reseal and store for 7 days at 60 deg. C, and evaluate for compliance with 3.3.2.1.

4.3.2.2 Full container. In accordance with method 3022 of Fed. Test Method Std. No. 141, allow a full quart can of the enamel to stand undisturbed for 12 months, and then examine the contents. Evaluate pigment settling or caking, but agitate the can for 5 minutes on the paint shaker prior to re-examination. Make other applicable tests for compliance with 3.3.2.2.

4.3.3 Dilution stability. Reduce one part by volume of enamel as packaged with one part by volume of thinner conforming to TT-T-291, type II, grade A. Then test in accordance with method 4203 of Fed. Test Method Std. No. 141, and evaluate for compliance with 3.3.3.

4.3.4 Brushing properties. Using the enamel as packaged, determine brushing properties in accordance with procedure 4.2 of method 4321 of Fed. Test Method Std. No. 141, and evaluate for compliance with 3.3.4. Immediately place the panel in a vertical position for air drying. After the film has dried, evaluate the characteristics of the enamel for compliance with 3.3.4.

4.3.5 Spraying properties. Reduce eight parts by volume of enamel with one part by volume of thinner conforming to TT-T-291, type II, grade A. Spray on a steel panel to a dry film thickness of 25 +/- 2 um (0.0010 +/- 0.001 in), and evaluate the spraying properties in accordance with method 4331 of Fed. Test Method Std. No. 141 for compliance with 3.3.5.

4.3.6 Compatibility test (type II only). In a beaker containing approximately 100 g of type II paint, place 2.0 g of tinting medium concentrate conforming to TT-T-390, color 2a. Stir thoroughly until the tinting concentrate is evenly dispersed to a homogeneous mixture. Allow the mixture to stand undisturbed for 5 minutes. On one clear plate-glass panel, prepared in accordance with method 2021 of Fed. Test Method Std. No. 141, brush a coat of the mixture to approximately 25 um (0.001 in) dry film thickness and allow to dry at room temperature in a vertical position for 24 hours. While brushing, observe for streaks and pigment separation. On another panel prepared in the same way, draw down a 5 um (0.002 in) wet film thickness of the mixture. While the paint is still wet, rub-up an area using the index finger in circular motion and continue for a minimum of 20 revolutions. Exert light pressure of the finger while rubbing so as not to rub off the film. Allow the paint film to dry at standard conditions for 24 hours. Examine the dried film, and compare the rubbed-up area against the unrubbed-up area. A difference in color or 60 deg., gloss (tested in accordance with method 6103 of Fed. Test Method Std. No. 141A) of the dried film between these areas shall constitute incompatibility. Evaluate for compliance with 3.3.14.

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4.3.7 Flexibility. Determine flexibility in accordance with method 6221 of Fed. Test Method Std. No. 141. Draw down a film of the enamel on a flat tin panel using an applicator which produces a dry film 76 um (0.003 in) thick. Air-dry for 18 hours, bake for 5 hours at 105 +/- 2˚C, and bend over a 3.2 mm 1/8 in) mandrel after cooling for 1/2 hour at standard conditions. Examine the coating for cracks over the area of the bend in a strong light at a 7-diameter magnification, and evaluate for compliance with 3.3.7.

4.3.8 Knife test. Perform the knife test in accordance with method 6304 of Fed. Test Method Std. No. 141. Cut the film from the flat portion of the panel used for the flexibility test (see 4.3.7), and evaluate the result for compliance with 3.3.8.

4.3.9 Recoating. Prepare the enamel as in method 4061 of Fed. Test Method Std. No. 141. Air-dry for 24 hours under standard conditions. Apply a second coat perpendicular to the first coat, and then air-dry as before. Evaluate for compliance with 3.3.9.

4.3.10 Hydrocarbon resistance. Draw down a film of the enamel to a dry-film thickness of 50 um (0.002 in) on a tin panel which was prepared in accordance with method 2012 of Fed. Test Method Std. No. 141 using the petroleum naptha-ethylene glycol monoethyl ether mixture as a cleaner. Air-dry the enamel for 96 hours; then immerse about half of the panel for 2 hours in hydrocarbon fluid conforming to TT-5-735, type III; in accordance with method 6011 of Fed. Test Method Std. No. 141, except maintain the temperature of the liquid at 75 deg. F. At the end of the test period, remove and examine for compliance with 3.4.10.

4.3.11 Sag resistance. Mount a sealed Morest or Leneta test chart on the vacuum plate of an automatic film applicator. Set a Leneta Anti-Sag Meter at the top of the test chart with the open side of the blade facing the operator. Place a suitable quantity of enamel directly in front of the blade, and draw down the enamel. The completed draw down shall then be removed from the Automatic Film Applicator immediately and placed in a vertical position with the stripes horizontal, the thinnest stripe being at the top. Allow to dry in this position, and then determine the Anti-Sag Index as follows: The lowest (heaviest film thickness) stripe which does not touch the next lower stripe is the Index Stripe. Fractional values are obtained by adding to the index value a fractional value based on the degree to which the stripe below the index stripe has merged with the next stripe, as follows:

Degree of merger	Add
Complete (intervening block is completely wetted)	0.0
Not complete, but definitely more than half	0.2
Approximately half	0.4
Appreciable, but definitely less than half	0.6
Slight, just touching	0.8

Evaluate for compliance with 3.3.11.

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4.3.12 Water resistance. Prepare a film of the enamel as in 4.3.10. Air-dry the enamel for 96 hours at standard conditions, then immerse about half of the panel in distilled water at 23 +/- 1 deg. C for 18 hours in accordance with ASTM method D 1308, sec. SD, except maintain the temperature of the liquid at 23 deg. C. At the end of the test period, remove and evaluate for compliance with 3.4.11.

4.3.13 Leveling properties. The panel shall be prepared by drawing down a film of the enamel on clear polished plate glass with a NYPC Leveling Blade. Allow the film to dry in a horizontal position for 24 hours and then determine the Leveling Index as follows:

	Index
All pairs open, none flowed together.	0
Pair A flowed to just contact; Pairs B, C, D, E open.	1
Pair A flowed together; Pairs B, C, D, E open.	2
Pair A flowed together; Pairs flowed to contact; Pairs C, D, E open.	3
Pairs A and B flowed together; Pairs C, D, E open.	4
Pairs A and B flowed together; Pair C to just contact; Pairs D and E open.	5
Pairs A, B, and C flowed together; Pairs D and E open.	6
Pairs A, B, and C flowed together; Pair D to just contact; Pair E open.	7
Pairs A, B, C, and D flowed together; Pair E open.	8
Pairs A, B, C, and D flowed together; Pair E to just contact.	9
Pairs A, B, C, D, and E flowed together.	10

Evaluate for compliance with 3.3.13.

4.3.14 Lead content.

4.3.14.1 Sample preparation. Using a 0.006-inch film applicator and a mechanical applicator plate, duplicate drawdowns for each sample of well-mixed paint shall be made on a standard paint penetration chart and dried for 24 hours. The draw-down shall be at least 10 inches long on the sealed portion of the penetration chart. The drawdown shall be cut to discs of appropriate size to fit the sample holder of a fluorescence X-ray spectrometer.

4.3.14.2 Procedure. Lead content shall be determined using an X-ray fluorescence spectrometer capable of determining lead content at a minimum level of 0.03 percent by weight of the total nonvolatile. The settings for a wavelength dispersive fluorescence spectrometer shall be as follows: [1]

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

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

4.3.14.3 Calculation:

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

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 sample and evaluated for compliance with table I.

(1) Energy dispersive fluorescene spectrometers shall be set up according to the manufacturer's manual.

4.3.15 Solvent analysis.

4.3.15.1 Solvent extraction. The solvent shall be extracted from the enamel in accordance with ASTM method D 3272.

4.3.15.2 Solvent Composition. The composition of the solvent shall be determined in accordance with method 7360 of Fed. Test Method Std. No. 141, using the extracted solvent obtained in 4.3.16.1.

4.3.15.3 Halogenated compounds. The presence of halogenated compounds shall be determined in accordance with method 5132 of Fed. Test Method Std. No. 141.

4.3.15.4 Benzene. When the solvent is tested in accordance with 4.3.16.2, the benzene peak shall be examined for compliance with 3.1.3.

4.3.16 Color. The film shall be applied on a smooth, flat chart in successive coats, each having a dry-film thickness of 76 um (0.003 in), until complete hiding is achieved, and shall be allowed to dry for 24 hours at standard conditions. Determine the color of the dried film in accordance with method 4250 of Fed. Test Method Std. No. 141, and evaluate for compliance with 3.4.3.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or Commercial, as specified (see 6.2).

5.1.1 Level A. The enamel shall be furnished in l-quart metal cans, l-gallon metal cans, or 5-gallon metal pails, as specified (see 6.2). The metal cans and pails shall meet or exceed the requirements of DOT Specifications under 49 CFR 178.

5.1.2 Commercial. The enamel shall be packaged in cans or pails, as applicable, in accordance with normal commercial practice. The complete package shall be designed to protect the item against damage during shipment, handling and storage.

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5.2 Packing. Packing shall be level A or Commercial, as specified (see 6.2).

5.2.1 Level A. Twelve l-quart cans or four l-gallon cans of enamel, packaged as specified in 5.1, shall be packed in fiberboard boxes made from weather-resistant fiberboard with a bursting test strength of not less than 275 lbs. per square inch. The box flaps shall be secured with water-resistant adhesive applied to not less than 75 percent of the surface area of contact between the flaps, or with 3 inch wide waterproof tape applied to the full length of the seams and extending over the ends not less than 3 inches. Alternatively, fiberboard, cleated plywood, or nailed wood boxes shall be acceptable shipping containers when lined with a waterproof barrier material. The barrier material shall be sealed at the edges with waterproof tape or adhesive. Five gallon metal pails need no further packing.

5.2.2 Commercial. The one quart, and one gallon enamel packaged as specified in 5.1, shall be packed in fiberboard boxes to ensure safe delivery at destination, to provide for safe redistribution by the initial receiving activity, and shall be acceptable by common carrier under the National Motor Freight Classification or Uniform Freight Classification.

5.3 Unitization. When shipments to Government depots are full car or truckload, the shipping containers shall be unitized for shipment and handling in accordance with normal commercial practice. The unitized load shall not exceed 2,500 pounds in weight, 63 inches in height, 56 inches in length, and 45 inches in width.

5.4 Marking. Packages, shipping containers, and unitized loads (when applicable) shall be marked in accordance with Fed. Std. No. 123.

6. NOTES

6.1 Intended use. The enamel covered by this specification is intended for general interior use on dry walls, plaster, masonry, ceilings, woodwork, and metal surfaces. This enamel is characterized by easy brushing, excellent color retention wood drying, hydrocarbon and water resistance, and excellent flexibility. It may be used as a decorative coating on properly primed walls and ceilings of plaster, wallboard, and similar surfaces, as well as on wood trim and metal (pretreated or otherwise prepared for painting) surfaces.

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) Type required (see 1.2).
(c) Color required (see 3.4.3).
(d) Level of packaging and level of packing required (see 5.1).
(e) Quantities to be packed (see 5.1).

6.3 The type II tint-base white paint is a high-hiding white paint which can be tinted to the desired light color before application. This paint can also be used directly as a regular white paint.

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TT-E-506K
AMENDMENT - 1
May 18, 1984

FEDERAL SPECIFICATION

ENAMEL, ALKYD, GLOSS, TINTS AND WHITE (FOR INTERIOR USE)

This amendment, which forms a part of Federal Specification TT-E-506K, dated July 6, 1977, has been approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal agencies.

PAGE I

Paragraph 2.1, under Federal Specifications. Delete "SS-L-30", "TT-E-508", "TT-E-543", "TT-P-650", and "LLL-B-1188".

PAGE 2

Paragraph 2.2, under American Society for Testing and Materials (ASTM) Standards. Add:

D 523 - Specular Gloss.
D 1729 - Visual Evaluation of Color Differences of Opaque Materials.
D 1849 - Package Stability of Paint.
D 2698 - Pigment Content of Solvent-Type Paints by High-Speed Centrifuging.
D 2801 - Leveling Characteristics of Paints by Draw-Down Method.
D 2805 - Hiding Power of Paints.
D 3335 - Low concentrations of Lead, Cadmium, and Colbalt in Paint by Atomic Absorption Spectroscopy.

PAGE 3

Paragraph 3.1.1, line 5. Change "table III" to "table IV".

Paragraph 3.1.3. Change to read:

3.1.3 Solvent. The solvent, when tested as specified in 4.3.15, shall conform to the following requirements by volume:

(a) Organic solvents having olefinic or cyclo-olefinic unsaturation: 5 percent maximum.
(b) Volatile aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent maximum.
(c) Ethylbenzene, branched structure ketones, or toluene: 20 percent maximum.
(d) Total of (a) + (b) + (c): 20 percent maximum.
(e) Benzene: None.
(f) Halogenated hydrocarbons: None.

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Paragraph 3.2, line 4. Change "table V" to "table IV".

Paragraph 3.3.2.1, line 2. Change "4.3.3" to "4.3.2".

Paragraph 3.3.2.2, line 5. Change "viscosity" to "consistency".

PAGE 4

Top left corner, Change "TT-E-596K" to "TT-E-506K".

Paragraph 3.3.6, line 1. Change "4.3.14" to ~4.3.6".

Paragraph 3.3.13, line 2. Change "4.3.13" to "table IV".

TABLE I, line 5, Rosin and rosin derivative. Change "0" under maximum to "negative".

PAGE 5

Top right corner, Change "TT-E-596K" to "TT-E-506K".

PAGE 6

TABLE IV, line 4, Full container. Delete "3022". Add "D 1849" under ASTM Methods.

Line 12, Hydrocarbon resistance. Delete "6011". Add "D 1308" under ASTM Methods.

Line 16, Leveling properties. Add "D 2801" under ASTM Methods. Delete "4.3.13".

Line 17, Pigment. Change "D 476" to "D 2698".

Line 19, Nonvolatile vehicle. Delete "4053". Add "D 2698" under ASTM methods.

PAGE 7

TABLE IV, line 1, Coarse particles. Change "4091" to "4092".

Line 4, Gloss. Delete "6101". Add "D 523" under ASTM Methods and "4.3.17" under paragraph reference.

Line 10, Lead content. Add "D 3335" under ASTM Methods.

Line 14, Color. Delete "4250". Add "D 1729" under ASTM Methods.

Line 15, Hiding power. Delete "4121". Add "D 2805" under ASTM Methods.

Paragraph 4.3.2.2, lines 1 and 2. Change "method 3022 of Federal Test Method Standard No. 141" to "ASTM D 1849".

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Paragraph 4.3.6, line 1. Change "5 um" to "50 um".

Lines 7 and 8. Change "method 6103 of Federal Test Method Standard No. 141A" to "ASTM D 523".

Paragraph 4.3.10, lines 6 and 7. Change "method 6011 of Federal Test Method Standard No. 141" to "ASTM D 1308".

PAGE 9

Paragraph 4.3.13. Delete in its entirety.

Paragraph 4.3.14. Change to read:

"4.3.14, 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."

PAGE 10

Paragraph 4.3.16, lines 4 and 5. Change "method 4250 of Federal Test Method Standard No. 141" to "ASTM D 1729".

Add new paragraph 4.3.17 as follows:

4.3.17 Gloss. Draw down the enamel on plane, opaque, white glass panels specified in 2.1.5 of method 2021 of Federal Test Method Standard No. 141 with a film applicator which will produce a wet film thickness of 76 + 2 um (0.003 +/- 0.0001 inch). Determine 60 deg. specular gloss in accordance with ASTM D 523 after 48 hours and 168 hours air drying at 23 +/- 1 deg. C (73 +/- 2 deg. F) and a relative humidity of 50 +/- 4 percent in a dust-free environment.

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