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SUPERSEDING
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FEDERAL SPECIFICATION

ENAMEL, ODORLESS, ALKYD, INTERIOR, SEMIGLOSS, WHITE AND TINTS

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

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers odorless, alkyd, interior semigloss enamel, non-lead, in whites and tints. Two of the three classes are representative of materials to be used in specified areas, when air quality regulations are applicable.

1.2 Classification. The enamel shall be of the following types and classes (see 6.2):

Type I - Whites and tints (pastel)
Type II - High-hiding white, suitable for use as is, or as a tint base
Class 1 - Volatile organic compounds (VOC) limited
Class 2 - Not photochemically reactive
Class 3 - For use in areas without applicable air quality regulations

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-650 - Primer Coating, Latex Base, Interior, White (for Gypsum Wallboard)
TT-T-291 - Thinner, Paint, Mineral Spirits, Regular and Odorless
TT-T-390 - Tinting Medium, Concentrate, General-Purpose
PPP-P-1892 - Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, and Marking of

AMSC N/A FSC 8010

Federal Standards:

FED-STD-141 - Paint, Varnish, Lacquer and Related Materials: Methods of Inspection, Sampling and Testing
FED-STD-313 - Material Safety Data Sheets Preparation and the Submission of

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards, and Commercial Item Descriptions. The Index, which includes cumulative bimonthly 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 and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.

(Federal Government activities may obtain copies of Federal standardization documents, and the Index of Federal Specifications, Standards, and Commercial Item Descriptions from established distribution points in their agencies.)

Federal Regulations:

Code of Federal Regulations (CFR)

Title 24 - Housing and Urban Development
Part 35 - Lead-Based Poisoning Prevention in Certain Residential Structures

(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 invitiation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM):

D562 - Consistency of Paints Using the Stormer Viscometer, Test Method for

D563 - Phthalic Anhydride Content of Alkyd Resins and Resin Solutions, Test Method for
D1210 - Fineness of Dispersion of Pigment-Vehicle Systems, Test Method for
D1296 - Odor of Volatile Solvents and Diluents, Test Method for
D1475 - Density of Paint, Varnish, Lacquer, and Related Products, Test Method for
D1542 - Qualitative Tests for Rosin in Varnishes, Method of
D1729 - Visual Evaluation of Color Differences of Opaque Materials, Practice for
D1849 - Package Stability of Paint, Test Method for
D2245 - Identification of Oils and Oil Acids in Solvent-Reducible Paints, Method for
D2697 - Volume Nonvolatile Matter in Clear or Pigmented Coatings, Test Method for
D2698 - Determination of the Pigment Content of Solvent-Reducible Paints by High-Speed Centrifuging, Method for
D2801 - Leveling Characteristics of Paints by Draw-Down Method, Test Method for
D3335 - Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy, Test Method for
D3924 - Standard Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials, Specification for
D3925 - Sampling Liquid Paints and Related Pigmented Coatings, Practice for
D4017 - Water in Paints and Paint Materials by Karl Fischer Method, Test Method for
D4287 - Determination of Viscosity of Paints and Varnishes at a High Rate of Shear by the ICI Cone/Plate Viscometer, Test Method for
E97 - Directional Reflectance Factor, 45-deg 0-deg, of Opaque Specimens by Broad-Band Filter Reflectometry, Test Method for

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

Illinois Administrative (Ill. Adm.) Code:

Title 35 - Environmental Protection
Section 211.122 - Definitions
Section 215.561 - Architectural Coatings

(Application for copies should be addressed to the Illinois Environmental Protection Agency, 2200 Churchill Road, Springfield, IL 62706.)

Southern California Air Quality Management District (SCAQMD) Rules and Regulations:

Rule 1113 - Architectural Coatings

(Application for copies should be addressed to the South Coast Air Quality Management District, 9150 E. Flair Drive, El Monte, CA 91731.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order (see 6.2), a sample shall be subjected to first article inspection (see 4.2.1 and 6.3).

3.2 Composition.

3.2.1 Nonvolatile vehicle. The nonvolatile vehicle shall be a pure soya drying-oil alkyd, as specified in Table I.

3.2.2 Volatile vehicle.

3.2.2.1 Class 1. The VOC content shall be limited as defined by SCAQMD Rule 1113, for the intended use.

3.2.2.2 Class 2. The composition of the volatile vehicle shall allow the coating to be not photochemically reactive as defined by 35 Ill. Adm. Code 211.122 and 215.561, for the intended use.

3.3 Enamel. The enamel shall conform to the requirements of Table I when tested as specified.

TABLE I. Enamel

	Requirements			Test Methods		
Characteristics	Min	Max	Para	ASTM	FTMS 141	Para
Analysis						
Pigment, mass percent	35.0	-	3.4	D2698	-	-
Nonvolatile vehicle						
Mass percent of vehicle	35.0	-	-	D2698	-	-
Identification	-	-	3.2.1	D2245	-	-
Phthalic anhydride, mass percent	25.0	28.0	-	D563	-	-
Lead, mass percent of nonvolatile	-	0.06	3.5.1	D3335	-	-

Solids volume, percent	43.0	-	3.4	D2697	-	-

TABLE I. Enamel (continued)

Characteristics	Requirements Min	Max	Para	Test Methods ASTM	FTMS 141	Para
Water, mass percent	-	0.5	-	D4017	-	-
Rosin and rosin derivatives	-	neg	-	D15421	-	-
Properties						
Odor	-	-	3.3.1	D1296	-	
Condition in container	-	-	3.3.2	-	3011	-
Density, kg/L (lb/gal)	1.20(10.0)	-	3.4	D1475	-	-
Storage stability						
Skinning	-	-	3.3.3.1	-	3021	-
Accelerated aging	-	-	3.3.3.2	D1849	-	4.4.1
Coarse particles and skins, mass percent of enamel	-	0.10	-	-	4092	-
Fineness of dispersion, Hegman units	6.0	-	-	D1210	-	-
Consistency, Krebs units	75.0	100.0	3.4	D562	-	-
Viscosity, pascal seconds	-	-	3.3.4	D4287	-	-
Application						
Brushing properties	-	-	3.3.5	-	4321	4.4.2
Spraying properties	-	-	3.3.6	-	4331	-
Leveling index	5	-	-	D2801	-	-
Sag resistance index	7	-	-	-	4494	-
Dry-hard time, hours	-	12	-	-	4061	-
Appearance of Dry Film						
Daylight 45,0 directional						

reflectance, type II	90	-	-	E97	-	-
Contrast ratio at 13.25m2/L (540 ft2/gal)						
Reflectance 82 and above	0.95	-	-	-	4121, Proc B, Meth B	-
76 - 81	0.96	-				
72 - 75	0.97	-				
68 - 71	0.98	-				
61 - 67	0.99	-				
60 and below	1.00	-				
60 specular gloss, after 168 hours	40.0	70.0	-	-	6101	-
Yellowness index difference, reflectances 80 and above	-	0.10	-	-	6131, 6132	-
Color, type I	-	-	3.3.7	D1729	-	-
Pigment compatibility, type II	-	-	3.3.8	-	-	4.4.3

TABLE I. Enamel (continued)

Characteristics	Requirements Min	Max	Test Methods Para	ASTM	FTMS 141	Para
Performance of Dry Film						
Washability						
Reflectance, percent of initial	98.0	-	-	-	61412	-
60 gloss, percent of initial	70.0	-	-	-	61412	-
Flexibility	-	-	3.3.9	-	6221	4.4.4
Knife test	-	-	3.3.10	-	6304	4.4.5
Recoating	-	-	3.3.11	-	-	4.4.6

1/ Using Lieberman-Storch test.

2/ Using carbon black soiling medium.

3.3.1 Odor. The odor of the enamel shall be similar to the odor of TT-T-291, type III material. There shall be no residual odor after 24 hours air drying.

3.3.2 Condition in container. The enamel in a freshly opened container shall be free from grit, seeds, skins, lumps, abnormal thickening, or livering, and shall show no more pigment settling or caking than can be readily redispersed with a paddle to a homogeneous state.

3.3.3 Storage stability.

3.3.3.1 Skinning. A three-quarter filled, closed container of the enamel, after 48 hours storage at room temperature from 21 to 32 degrees Centigrade (C) (70 to 90 Fahrenheit (F)), shall show no skinning.

3.3.3.2 Accelerated aging. The enamel, stored in a full, tightly closed container for 30 days at 51.7 + 1.1C (125 + 2F), shall show no curdling, gelling, skinning, or hard caking, and shall meet the fineness of dispersion, consistency, brushing, and spraying requirements of Table I.

3.3.4 Viscosity. The viscosity shall be the manufacturer’s standard for the product provided.

3.3.5 Brushing properties. The enamel shall brush without drag, and shall dry to a smooth, uniform film, free from seeds, runs, and brush marks.

3.3.6 Spraying properties. The enamel shall spray easily without running

or sagging, and shall dry to a smooth, uniform film, free from seeding, dusting, pigment float, haze, or orange peel.

3.3.7 Color, type I. The enamel at complete hiding shall be a critical match to the color specified (see 6.2).

3.3.8 Pigment compatibility, type II. There shall be no evidence of incompatibility of the tint base with the tint concentrate. When tested, there shall be uniformity of color and gloss of the dried film.

3.3.9 Flexibility. The enamel film shall show no cracking or flaking when tested.

3.3.10 Knife test. The enamel film shall ribbon or curl from the panel when tested, and the cut shall show beveled edges.

3.3.11 Recoating. The enamel film shall show no lifting, softening, or other film irregularities when tested.

3.4 Batch verification. When specified (see 6.2), quality conformance tests (see 4.2.2.1) shall include the requirements of Table II, when a first article has been previously specified. The test values, X, shall be as specified in Table I, and shall be within the required ranges of the values determined in the first article testing, as specified in Table II.

TABLE II. Batch verification.

Characteristics	Requirements
Analysis	
Pigment, mass percent	X + 0.6
Solids volume, percent	X + 4.0
Properties	
Density, kg/L (lb/gal)	X + 0.05 (0.4)
Consistency, Krebs units	X + 10.0

3.5 Material Safety Data Sheets (MSDS). MSDS shall be submitted in accordance with FED-STD-313.

3.5.1 Lead content. Conformance to the 24 CFR 35 limitation of lead to 0.06 mass percent of the nonvolatile content shall be shown on the MSDS.

3.6 Air quality regulation marking, classes 1 and 2. Each unit container and shipping container marking shall include the mass of VOC in grams per liter and pounds per gallon of coating (Class 1), or if not photochemically reactive (Class 2), and shall also state that the material is to be used without thinning under normal environmental and application conditions.

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 as specified herein. Except as otherwise specified in the contract or purchase 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 supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2.1).
b. Quality conformance inspection (see 4.2.2).
c. Preparation for delivery inspection (see 4.5).

4.2.1 First article inspection. The first article inspection shall be performed on the material when a first article is required (see 3.1 and 6.2). This inspection shall include the tests of 4.4, and the preparation for delivery inspection of 4.5. The first article may be either first production material, or standard production material from the supplier's current inventory, provided the material meets the requirements of the specification and is representative of the ingredients and manufacturing technique applicable to the remaining material to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the the tests of 4.2.2.1, and the preparation for delivery inspection of 4.5, and conformance to 3.4 when specified. Additional tests may be performed as deemed necessary.

4.2.2.1 Quality conformance tests. Quality conformance inspection shall include the following test requirements of Table I:

a. Analysis
    (1) Pigment mass
    (2) Solids volume

b. Properties
   (1) Condition in container
   (2) Density
   (3) Consistency
   (4) Viscosity

c. Application
   (1) Drying time

d. Appearance of dry film
   (1) Reflectance, type II
   (2) Contrast ratio
   (3) Gloss
   (4) Color, type I
   (5) Pigment compatibility, type II

e. Performance of dry film
   (1) Flexibility
   (2) Knife test

4.3 Sampling. A lot shall consist of material from a single manufacturer's batch, defined as the end product of all raw materials mixed, blended, or processed in a single operation. Inspections shall be performed on samples selected in accordance with ASTM D3925.

4.4 Testing. The enamel shall be tested as specified in Table I. Unless otherwise specified, the standard conditions and requirements of ASTM D3924 shall apply. Failure of any test shall be cause for rejection of the lot from which the sample was taken.

4.4.1 Accelerated aging. After storage of the enamel 30 days in a 1-quart container, examine as specified in ASTM D1849, and test as applicable in Table I, to determine compliance wth 3.3.3.2.

4.4.2 Brushing properties. When testing, replace the surface sealer with TT-P-650 latex as the primer coating for the sheetrock panel.

4.4.3 Pigment compatibility, type II. Test pigment compatibility by the procedure specified in the compatibility test of TT-T-390, with the following exceptions: Use TT-E-509 as the base material, and material conforming to TT-T-390 color 2a as the tinting concentrate. Examine the dried film for uniformity of color and gloss, comparing the rubbed-up area against the unrubbed-up area.

4.4.4 Flexibility. Test as specified in FED-STD-141, method 6221. Apply the paint at a dry film thickness of 37 + 2 um (0.0015 + 0.0001 inch) to a 75- by 125-mm (3- by 5-inch) tinplate panel conforming to method 2012. Air-dry the panel 2 hours, then bake 24 hours at 105 + 2C (221 + 3.6F). Use a 3.2-mm (1/8-inch) diameter mandrel.

4.4.5 Knife test. Cut the film from a flat portion of the panel used in 4.4.4, at a location away from the bent area, and examine.

4.4.6 Recoating. After the panel prepared for the brushing properties test has air-dried 24 hours, recoat with a second brush coat. Evaluate during brushing and after drying.

4.5 Preparation for delivery inspection. The inspection of the packaging, packing, and marking shall be in accordance with the requirements of section 4 of PPP-P-1892.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing, and marking. Packaging, packing, and marking shall be in accordance with the requirements of PPP-P-1892, with the level of packaging and the level of packing as specified (see 6.2). The enamel shall be furnished in 1-gallon and 5-gallon containers as specified (see 6.2).

5.1.1 Special marking. In addition to other markings required by PPP-P-1892, containers shall be marked with air quality regulations conformance (see 3.6).

6. NOTES

6.1 Intended use. This enamel is intended for general interior use on walls and woodwork where an odorless semigloss enamel with good washability is required. It is particularly useful in hospitals, laundries, kitchens, and bathrooms, where the maintenance of sanitary conditions is important. It may be used as a decorative coating on properly primed walls and ceilings of wood, plaster, wallboard, and similar surfaces, as well as on wood trim and metal. An odorless primer, TT-E-545, may be used as an undercoat for application to wood or metal. A latex primer, TT-P-650, should be used for application to wallboard and plaster.

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

a. Title, number, and date of this specification.
b. Type and class required (see 1.2 and 6.4).
c. When a first article is required for inspection and approval (see 3.1 and 6.3).
d. Color, when type I is required (see 3.3.7).
e. When batch verification is required (see 3.4).
f. Level of packaging and level of packing required (see 5.1).
g. Size of container required (see 5.1).

6.3 First article. When a first article inspection is required, the material will be tested, and should be a sample selected from the first production material, or it may be standard production material from the

contractor's current inventory, as specified in 4.2.1. The first article should consist of two gallons of material. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.4 Conformance to air quality regulations. Purchasers will specify material as described (see 3.2.2 and 3.6), or as otherwise required, to conform to the most stringent air quality regulations for intended jurisdictions and applications of use.

6.5 Subject term (key word) listing.

Aging, accelerated
Air quality regulation marking
Alkyd
Batch verification
Enamel
First article
Interior
Odorless
Photochemically reactive
Solids volume
Tint base
Viscometer, ICI cone/plate
Volatile organic compounds

MILITARY CUSTODIANS:

Army - ME
Navy - YD
Air Force - 84

Review Activities:

Army - MD, MR

User Activities:

Army - CE
Navy - MC

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

Preparing Activity:

Navy - YD

Project 8010-1067

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.