

TT-P-24E
April 2, 1985
SUPERSEDING
TT-P-24D
December 5, 1972

FEDERAL SPECIFICATION

PAINT, OIL (EXTERIOR CONCRETE AND MASONRY)

This specification is approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal Agencies.

1. SCOPE AND CLASSIFICATION. This specification covers an oil paint in eggshell gloss for exterior concrete and masonry in the following types:

Type I - White (may be tinted to pastel shades)
Type II - Tints

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-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

Federal Standards:

Fed. Test Method Std. No. 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

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.)

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 Paints Using the Stormer Viscometer
D 659 - Evaluating Degree of Chalking of Exterior Paints
D 1210 - Fineness of Dispersion of Pigment-Vehicle Systems
D 1647 - Resistance to Water and Alkali of Dried Films of Varnishes

- D 1729 - Visual Evaluation of Color Differences of Opaque Materials
- D 1849 - Package Stability of Paint
- D 2244 - Instrumental Evaluation of Color Differences of Opaque
Materials
- D 2698 - Pigment Content of Solvent-Type Paints by High-Speed
Centrifuging
- D 2805 - Hiding Power of Paints
- 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
Fungal Growth or Soil and Dirt Accumulation

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- D 3335 - Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
- E 97 - 45-deg, 0-deg Directional Reflectance Factor of Opaque Specimens by Broad-Band Filter Reflectometry
- E 260 - General Gas Chromatography Procedures
- G 53 - Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Material

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

South Coast Air Quality Management District Rules and Regulations:

Rules 102 and 1113

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

3 REQUIREMENTS

3.1 Materials. Materials shall be selected by the supplier to meet all requirements of this specification and shall be free from toxic materials under normal conditions of use. The volatile solvent used shall be nonphotochemically reactive as defined in South Coast Air Quality Management District Rule 102 when tested as specified in table II.

3.2 Qualitative requirements.

3.2.1 Condition in container. When tested as specified in table II, the paint shall not be skinned, nor thickened, nor settled to such degree that it can not be redispersed to a uniform brushing consistency by 5 minutes hand stirring.

3.2.2 Color. When tested as specified in table II at complete hiding, the color of the paint shall be a critical match to the color specified.

3.2.3 Skinning. A three-quarter filled, sealed 8 ounce container shall not skin within 48 hours when tested as specified in table II.

3.2.4 Package stability. The paint shall show no skinning, livering, curdling, caking, or tough gummy sediment when tested as specified in 4.3.1.

3.2.5 Dilution stability. When tested as specified in 4.3.2, the paint shall show no curdling or vehicle separation. Slight pigment settling shall not be cause for rejection.

3.2.6 Brushing properties. When tested as specified in 4.3.3, the paint shall brush easily and shall dry to a smooth uniform film free from runs, sags, and brush marks.

3.2.7 Recoating. When tested as specified in 4.3.4, recoating a dried film of paint shall cause no lifting or wrinkling. When second coat shall dry to a smooth finish with uniform gloss.

3.2.8 Spraying properties. When tested as specified in 4.3.5, the paint shall spray satisfactorily and shall dry to a uniform film free from orange peel, runs, dusting or color separation.

3.2.9 Flexibility. A film of paint tested as specified in 4.3.6 shall not

crack or flake.

3.2.10 Knife test. A film of paint tested as specified in 4.3.7, shall ribbon or curl from the panel. The cut shall show beveled edges.

3.2.11 Alkali resistance. When tested as specified in 4.3.8, the paint shall show no blistering or wrinkling immediately after removal from the alkaline solution. After 24 hours air drying the film shall show no change in color, gloss, or adhesion when compared with the unimmersed portion of the tube.

3.2.12 Mildew resistance. When tested as specified in table II, the Paint shall show no growth greater than that represented by No. 8 of the photographic standards.

3.2.13 Accelerated weathering. When tested as specified in 4.3.9, the paint shall show no more than slight (No. 8) chalking; a loss of more than 40 percent of the initial gloss; a $L^*a^*b^*$ color change, ΔE , greater than 4 units for yellow and red hues; or a $L^*a^*b^*$ color change, ΔE , greater than 2 units for other hues.

3.2.14 Compatibility (type I only). When tested as specified in 4.3.10, the dried film shall show uniform color and gloss.

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

TABLE I. Quantitative requirements

| Characteristics | Requirements | |
|---|--------------|---------|
| | Minimum | Maximum |
| Pigment, percent mass of paint | 60 | -- |
| Nonvolatile vehicle, percent mass of vehicle | 40 | -- |
| Water, percent mass of paint | -- | 0.5 |
| Coarse particles and skins, percent mass of pigment | -- | 1.0 |
| Consistency, KU | 89 | 104 |
| Drying time | | |
| Set to touch, hours | -- | 4 |
| Dry hard, hours | -- | 18 |
| 60 deg. Specular gloss | -- | 30 |
| Fineness of grind | 3 | -- |
| Directional reflectance (type I only) | 90 | -- |
| Contrast ratio [at 11.0 m ^{L2J} /L (450 ft ^{L2J} /gal)] | | |
| Reflectivity 82 and above | 0.95 | -- |
| 76 - 81 | 0.96 | -- |
| 72 - 75 | 0.97 | -- |
| 68 - 71 | 0.98 | -- |
| 61 - 67 | 0.99 | -- |
| 60 and lower | 1.00 | -- |
| Lead content, percent mass of total nonvolatile | -- | 0.06 |

3.4 Special marking. Each unit container and shipping container shall be marked with the volatile organic content (VOC) in grams per liter and pounds per gallon of paint, referenced to SCAQMD Rule 1113, and shall specify that the paint is to be used without thinning where air pollution regulations are in effect.

3.5. Material Safety Data Sheet. A material safety data sheet shall be prepared for the paint by the manufacturer in accordance with Fed. Std. No. 313 and submitted to the contracting officer (see 6.2).

4 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or 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 paint 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 paint 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. Test Method Std. No. 141. Failure of any test shall be cause for rejection of the lot from which the sample was taken.

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TABLE II. Index

| Characteristic | Requirement Paragraph | Test Methods | | Reference Paragraph |
|-------------------------|-----------------------|-------------------------------|--------------------|---------------------|
| | | Fed. Test Method Std. No. 141 | ASTM Method | |
| Volatile content | 3.1 | --- | E 260 | --- |
| Condition in container | 3.2.1 | 3011 | --- | --- |
| Color | 3.2.2 | --- | D 1729 | --- |
| Skinning | 3.2.3 | 3021 | --- | --- |
| Package stability | 3.2.4 | --- | D 1849 | 4.3.1 |
| Dilution stability | 3.2.5 | 4203 | --- | 4.3.2 |
| Brushing properties | 3.2.6 | 4321 | --- | 4.3.3 |
| Recoating | 3.2.7 | --- | --- | 4.3.4 |
| Spraying properties | 3.2.8 | 4331 | --- | 4.3.5 |
| Flexibility | 3.2.9 | 6221 | --- | 4.3.6 |
| Knife test | 3.2.10 | 6304 | --- | 4.3.7 |
| Alkali resistance | 3.2.11 | --- | D 1647 | 4.3.8 |
| Mildew resistance | 3.2.12 | --- | D 3273, D 3274 | --- |
| Accelerated weathering | 3.2.13 | --- | G 53 D 659, D 2244 | 4.3.9 |
| Compatibility | 3.2.14 | --- | --- | 4.3.10 |
| Pigment | Table I | --- | D 2698 | --- |
| Nonvolatile vehicle | Table I | --- | D 2698 | --- |
| Water | Table I | 4081 | --- | --- |
| Coarse particles | Table I | 4091 | --- | --- |
| Consistency | Table I | --- | D 562 | --- |
| Drying time | Table I | 4061 | --- | --- |
| 60 deg. Specular gloss | Table I | --- | D 523 | 4.3.11 |
| Fineness of grind | Table I | --- | D 1210 | --- |
| Directional reflectance | Table I | --- | E 97 | --- |
| Contrast ratio | Table I | --- | D 2805 | --- |
| Lead content | Table I | --- | D 3335 | 4.3.12 |

4.3.1 Package stability. Store a full, sealed one liter (one quart) can of paint at 50 +/- 1 deg. C (125 +/- 2 deg. F for 4 weeks. After storage examine the paint in accordance with ASTM D 1849.

4.3.2 Dilution stability. Test the paint in accordance with method 4203 of Fed. Test Method Std. No. 141 using thinner complying with type I of TT-T-291 as the diluent.

4.3.3 Brushing properties. Determine brushing properties in accordance with method 4321 of Fed. Test Method Std. No. 141. Evaluate during brushing and after drying for compliance with 3.2.6.

4.3.5 Spraying properties. Reduce eight parts by volume of paint with not more than one part by volume of thinner complying with type I of TT-T-291. Spray on a steel panel to a dry film thickness of 25 +/- 2 um (0.001 +/- 0.0001 inch) in accordance with method 4331 of Fed. Test Method Std. No. 141. Evaluate during spraying and after drying for compliance with 3.2.8.

4.3.6 Flexibility. Draw down a wet film thickness of 76 +/- 2 um (0.003 +/- 0.0001 inch) on a panel complying with method 2012 of Fed. Test Method Std. No. 141. Air dry 18 hours at room temperature, bake 5 hours at 105 +/- 2 deg. C (221 +/- 4 deg. F), and cool at room temperature 1/2 hour. Bend the panel over a 3.2 mm (1/8 inch) diameter mandrel and examine in accordance with method 6221 of Fed. Test Method Std. No. 141.

4.3.7 Knife test. Cut the film from a flat portion of the flexibility panel (4.3.6) in accordance with method 6304 of Fed. Test Method Std. No. 141.

4.3.8 Alkali resistance. Test films shall be prepared and tested as in ASTM D 1647 except that 2 tubes shall be dipped in the unreduced paint, air dried 72 hours, immersed in the alkaline solution for 1 hour, washed with distilled water, and examined immediately and after 24 hours air drying for compliance with 3.2.11.

4.3.9 Accelerated weathering.

4.3.9.1 Panel preparation. Draw down the paint at wet film thicknesses of 76 +/- 2 um (0.003 +/- 0.0001 inch) on 2 tinplate panels complying with method 2012 of Fed. Test Method Std. No. 141 and air dry 96 hours at room temperature. Determine color in accordance with ASTM D 2244 and 60 deg. gloss in accordance with ASTM D 523.

4.3.9.2 Exposure. Expose the panels to 168 hours accelerated weathering in accordance with ASTM G 53 using an exposure cycle of 4 hour UV exposure at 60 deg. C (140 deg. F) followed by 4 hours condensation exposure at 40 deg. C (104 deg. F). Examine the exposed panels for chalking in accordance with ASTM D 659 using a velvet cloth of contrasting color to the paint.

4.3.9.3 Gloss and color change. Wash the panels under running water and allow to air dry 24 hours at room temperature. Determine color and gloss as in 4.3.9.1 and evaluate for compliance with 3.2.13.

4.3.10 Compatibility (type I only). Thoroughly mix 2.0 +/- 0.1g of tinting concentrate conforming to color 2a of TT-T-390 with 100 ml of type I paint. Allow to stand undisturbed for 5 minutes. Brush a coat of the mixture on a clean glass panel to a dry film thickness of approximately 37 um (0.0015 inch). While the paint is still wet, rub a area using the index finger in a circular motion for 20 revolutions. Exert light pressure so as not to rub off the film. Allow to dry in a vertical position for 24 hours. Evaluate for compliance with 3.2.14.

4.3.11 60 deg. specular gloss. Draw down the paint on plane, opaque, white glass panels as prescribed in 2.1.5 of method 2021 of Fed. Test Method Std. No.141 to a wet film thickness of 76 +/- 2 um (0.003 +/- 0.0001 inch). Dry the panels 48 hours at standard conditions in a dust-free environment. Determine 60 deg. specular gloss in accordance with ASTM D 523.

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

5 PREPARATION FOR DELIVERY

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

6 NOTES

6.1 Intended use. The paint covered by this specification is intended for use as a primer and finish coat over cured interior and exterior concrete and masonry. It should not be used on floors.

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

- (a) Title, number and date of this specification.
- (b) Type and/or color required (see section 1).
- (c) Quantity and size of container required (see 5.1).
- (d) Packaging, packing, and marking required (see 5.1).
- (e) A Material Safety Data Sheet shall be prepared (see 3.5).

MILITARY COORDINATING ACTIVITY:

CIVIL AGENCY INTEREST

Air Force - 99

COM - NBS

VA - OSS

MILITARY CUSTODIAN:

PREPARING ACTIVITY

Air Force - 99

GSA - FSS

REVIEW ACTIVITY:

Air Force - 84

USER ACTIVITY:

Navy - MC