

TT-P-59E
June 17, 1975

SUPERSEDING
Int. Fed. Spec. TT-P-0059d (GSA-FSS)
June 26, 1968 and
Fed. Spec. TT-P-59c
May 10, 1961

FEDERAL SPECIFICATION

PAINT, READY-MIXED, INTERNATIONAL ORANGE

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

1. SCOPE

1.1 This specification covers one type of ready-mixed exterior paint of international orange color utilizing molybdate orange pigments and suitable for use as a finish coat on wood and metal (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue 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-D-651 - Drier, Paint, Liquid.
- TT-P-25 - Primer Coating, Exterior (Undercoat For Wood, Ready-mixed, White and Tints).
- TT-P-57 - Paint, Zinc Yellow-iron Oxide-base, Ready-mixed.
- TT-P-86 - Paint, Red-lead-base, Ready-mixed.
- TT-P-641 - Primer coating; Zinc Dust-zinc Oxide (For Galvanized Surfaces).
- TT-R-266 - Resin, Alkyd; Solutions.
- TT-T-291 - Thinner-paint, Volatile Spirits Petroleum Spirits.
- TT-T-801 - Turpentine; Gum Spirits, Steam Distilled, Sulfate Wood, and Destructively Distilled.
- PPP-P-1892 - Paint, Varnish, Lacquer, And Related Materials; Packaging, Packing, And Marking.

Federal Standards:

Fed. Test Method Std. No. 141/GEN - 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, D.C. 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, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, 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.)

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Military Standard:

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

(Copies of Military Specifications and Standards required by suppliers in connection with specific 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 234 - Raw Linseed Oil.
- D 562 - Consistency of Paints Using the Former Viscosimeter.
- D 563 - Phthalic Anhydride Content of Alkyd Resins and Resin Solutions.
- D 1398 - Fatty Acid Content of Alkyd Resins and Resin Solutions.
- D 1475 - Density of Paint, Varnish, Lacquer and Related Products.
- D 1542 - Rosin in Varnishes.
- D 2218 - Molybdate Orange.
- D 308 - Spectrophotometry and Description of Color in CIE 1931 System.

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

3. REQUIREMENTS

3.1 Pigment. When tested as specified in 4.4.3, the pigment portion of the paint shall conform to the quantitative requirements specified in table I. The molybdate orange shall conform to ASTM D 2218. The extending pigments may be magnesium silicate, aluminum silicate, silica, or a mixture thereof.

TABLE I. Quantitative requirements of the pigment

Ingredient	Percent by weight of total pigment	
	Minimum	Maximum
Molybdate orange	90	--
Extending pigments	--	10
Total chromium (computed to $PbCrO_4$)	65	--
Total lead (computed as $PbSO_4$)	75	--
Total molybdenum (computed to $PbMoO_4$)	9	--

3.2 Vehicle. When tested as specified in 4.4.3, the vehicle portion of the paint shall conform to the quantitative requirements specified in table II.

TABLE II. Quantitative requirements of the vehicle

Ingredient	Percent by weight of total vehicle	
	Minimum	Maximum

Raw linseed oil	66	--
Alkyd-resin solids	22	--
Thinner and drier	--	12

3.2.1 Nonvolatile. The nonvolatile matter shall consist of 75 percent raw linseed oil and 25 percent alkyd-resin solids. The linseed oil shall conform to ASTM D 234. The alkyd-resin solution shall be of the linseed-modified type conforming to TT-R-266, type II.

3.2.2 Thinner and drier. The thinner shall be volatile mineral spirits conforming to TT-T-291, grade A; turpentine conforming to TT-T-801; or a mixture of the two. The drier shall conform to TT-D651, type I.

3.2.3 Rosin and rosin derivatives. When tested as specified in 4.4.3, the vehicle shall contain no rosin or rosin derivatives. The test for rosin shall be negative. The vehicle may contain anti-skinning agents.

3.3 Quantitative requirements. When tested as specified in 4.4.3, the paint shall conform to the quantitative requirements specified in table III.

TABLE III. Quantitative requirements of paint

Characteristics	Requirements	
	Minimum	Maximum
Pigment, percent by weight of paint	59	—
Nonvolatile vehicle, percent by weight of vehicle	88	----
Phthalic anhydride, percent by weight of nonvolatile vehicle	5	----
Oil acids, percent by weight of nonvolatile vehicle	85	----
Water, percent by weight of paint	---	0.5
Coarse particles and skin (residue retained on No. 325 standard sieve percent by weight of pigment)	---	2
Consistency, Krebs-Stormer, shearing rate, 200 r.p.m.:		
Grams	200	325
Equivalent K.U.	82	98
Time to hard dry, hours	---	18
Weight per gallon, pounds	15	----

3.3.1 Color. When tested as specified in 4.4.3, the color of the paint shall be vivid reddish-orange matching Color 12197 of Fed. Std. 595 and shall conform to the requirements specified in table IV.

TABLE IV. Color requirements

Characteristics	Requirements		
	Minimum	Color 12197	Maximum
CIE chromaticity coordinate x	0.590	.607	----
CIE chromaticity coordinate y	0.350	.358	.365
Daylight reflectance Y	13.0	16.5	----

3.4 Qualitative requirements.

3.4.1 Condition in container. When tested as specified in 4.4.3, the paint shall not be settled, caked, or thickened to such a degree that it cannot be redispersed easily with a paddle to a good brushing consistency.

3.4.2 Brushing properties. When tested as specified in 4.4.3, the paint shall brush easily, have good flowing and spreading qualities, and shall dry to a smooth, uniform film, free from seeds, runs, sags, or streaks. The dried film shall show no brush or lap marks.

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 as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements 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 Lots. For the purposes of sampling, a lot of the paint shall consist of a manufacturer's batch. A batch is defined as the end product of all raw materials mixed, blended, or processed in a single operation.

4.3 Inspection.

4.3.1 Inspection of filled containers. A random sample of filled containers shall be selected in accordance with MIL-STD-105 at inspection level I and acceptable quality level (AQL) of 2.5 percent defective. Each sample filled container shall be examined for defects of connection of the container, and the closure for evidence of leakage and for unsatisfactory markings; each filled container shall also be gauged to determine the amount of contents. Any container in the sample having one or more defects or under required fill shall be rejected, and if the number of defective containers in any sample exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105, the lot representative by the sample shall be rejected.

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4.3.2 Inspection of preparation for delivery requirements. An inspection shall be made to determine that the packaging, packing, and marking comply with the requirements of section 5. Defects shall be scored in accordance with table V. For examination of interior packaging, the sample unit shall be one shipping container fully prepared for delivery selected at random just prior to the closing operations. Sampling shall be in accordance with MIL-STD-105. Defects of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 4.0 defects per hundred units.

TABLE V. Classification of preparation for delivery defects

Examine	Defects
Markings (exterior and interior)	Omitted; improper size, location, sequence, or method of application.
Materials	Any component missing or damaged.
Workmanship	Inadequate application of components, such as incomplete closure of container flaps, loose strapping, inadequate stapling. Bulging or distortion of container.

4.4 Testing of the end item.

4.4.1 Sampling for testing. For the purpose of sampling, the lot shall be expressed in units of gallons of paint. The sample unit for testing shall be one quart of paint randomly selected from containers in the lot. The paint shall be placed in separate clean, dry metal or glass containers, sealed, marked, and forwarded to the testing laboratories. The sample size shall be as follows:

Lot size (gallon)	Sample size
800 or less	2
801 up to and including 22,000	3
22,001 and more	5

Tests shall be performed on a sample unit basis. All tests reports shall contain the individual values utilized in expressing the final result. The lot shall be unacceptable if one or more sample unit fails to meet any test requirement specified.

4.4.2 Standard test conditions. Unless otherwise specified, all test specimens shall be prepared and tested in a room having a temperature of 23 +/- 1 degree C (73 +/- 2 degree F) and a relative humidity of 50 +/- 5 percent.

4.4.3 Test methods. All tests shall be conducted in accordance with the methods specified in table VI to determine compliance with the requirements of section 3.

TABLE VI. Test methods

Test	Methods		
	ASTM Standard	Fed. Test Method Std. No. 141	Paragraph reference
Pigment analysis	D 2218	7271	-----
Percentage of pigment	-----	4021	-----
Nonvolatile in vehicle	-----	4053	-----

Phthalic anhydride	D 563	----	-----
Oil acids	D 1398	----	-----
Water	-----	4081	-----
Coarse particles and skins	D 185	----	-----
Consistency	D 562	----	-----
Drying time	-----	4061	-----
Weight per gallon	D 1475	----	-----
Rosin and rosin derivatives	D 1542	----	4.4.3.1
Color	E 308	4250	4.4.3.2
Condition in container	-----	3011	-----
Brushing properties	-----	4321	-----

4.4.3.1 Rosin and rosin derivatives. A portion of the isolated vehicle shall be used and tested by the Lieberman-Storch test.

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4.4.3.2 Color. The paint shall be applied to a white, opaque plate-glass panel with a 0.002 inch (approximately 0.004 inch gap clearance) Bird film applicator or equal and allowed to dry at standard conditions (see 4.4.2) for 48 hours.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing, and marking. The paint furnished in 1-gallon cans or 5-gallon pails shall be packagked, packed, and marked in accordance with PPP-P-1892. The level of packaging shall be level A, B, or C, as specified in the contract or order (see 6.2).

5.2 Directions for use. The directions for use, which shall be clearly legible, shall be shown on the reverse side of the container and shall read as follows:

DIRECTIONS FOR USE

This international orange paint is intended for outside use as a topcoat on properly primed wood and metal. The paint dries overnight to a firm but somewhat soft film and two or three days should be allowed for drying between coats. This paint is used, among other purposes, for marking the roofs of airports. A one-coat application on wood shingles will usually give the desired appearance and is believed to be better practice than two-coat painting which may cause shingles to curl. In painting over composition (asphalt) shingles, the usual practice is to apply the aluminum paint as a sealer, followed by two coats of international orange paint. The paint may be applied by brushing or spraying (add one pint of mineral spirits, TT-T-291, grade 1, to each gallon of paint for spraying). The spreading rate should be approximately 600 square feet per gallon.

5.3 Precautionary marking. Each container shall be marked with the following:

WARNING!

This paint contains more than one-half of one percent lead, as lead metal, by weight, based on total nonvolatile substances. This paint shall not be used on residential structures.

6. NOTES

6.1 Intended use. International orange paint covered by this specification is intended for outside use as a top or finish coat on primed wood and metal, especially for marking roofs of airports. New wood may be primed with exterior wood undercoater conforming to TT-P-25, preferably factory tinted to a color that roughly approximates that of the international orange paint. Unpainted structural steel may be given a prime coat of read-lead linseed-oil paint (TT-P-86, type I) or zinc yellow iron oxide-based paint (TT-P-57, type I. Unpainted galvanized iron should be given prime coat of zinc dust-zinc oxide paint (TT-P-641, type I or II).

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

- (a) Title, number, and date of this specification.
- (b) Size and type of container required (see 5.1).
- (c) Quantity required.
- (d) Level of packaging and packing required (see 5.1).

6.3 The paint covered by this specification should be purchased by volume, the unit being one U.S. gallon of 231 cubic inches at 15.5 degrees C. (60 degrees F.).

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6.4 A paint meeting this specification and formulated as indicated below will have approximately the following volume and weight characteristics on a gallon basis:

	Gallons	Pounds
Pigment (59.9 percent by weight) :		
90.1 percent Molybdate orange	.1794	8.26
9.9 percent Magnesium Silicate	.0383	.91
Total pigment	.2177	9.17
Vehicle (40.1 percent by weight) :		
66.0 percent Raw Linseed Oil	.5242	4.06
22.0 percent Alkyd Resin Solids	.1531	1.35
Total nonvolatile	.8950	14.58
12.0 percent Thinner and drier	.1050	.74
Total paint	1.0000	15.32

Other volume characteristics of the paint:

	Percent
Opague pigment in total pigment	82.4
Transparent pigment in total pigment	17.6
Pigment in nonvolatile (PVC)	24.3

The above volume figures mean that one gallon of this paint contains 0.8950 gallon of total solids or film-forming materials, and that the dry film there is approximately 24.0 percent by volume of pigment and 76 percent by volume of oil, resin, and drying metals.

Preparing activity:

GSA - FSS

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 documents referenced herein. Price 30 cents each.

TT-P-59E
AMENDMENT-1
June 23, 1977

FEDERAL SPECIFICATION

PAINT, READY-MIXED, INTERNATIONAL ORANGE
(NOT FOR RESIDENTIAL USE)

This amendment, which forms a part of Federal Specification TT-P-59E, dated June 17, 1975, was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

PAGE 1

Paragraph 1.1 At end of paragraph add:

"WARNING: This paint shall not be used on residential structures."

PAGE 3

Add new paragraph:

"3.5 Precautionary label. Containers of international orange paint shall have the following warning on each container:

"WARNING"

"CONTAINS LEAD. DRIED FILM OF THIS PAINT
MAY BE HARMFUL IF EATEN OR CHEWED."

"Do not apply on toys and other children's articles, furniture, or interior surfaces of any dwelling or facility which may be occupied or used by children."

"Do not apply on those exterior surfaces of dwelling units, such as window sills, porches, stairs, or railings to which children may be commonly exposed."

"Keep out of reach of children."

PAGE 5

Paragraph 5.3, delete in its entirety and substitute:

"5.3 Precautionary marking. See 3.5."

Paragraph 6.1. At end of paragraph add: "This paint shall not be used on residential structures."

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