

TT-V-85C
April 5, 1976
SUPERSEDING
Fed. Spec. TT-V-85B
February 10, 1965

FEDERAL SPECIFICATION

VARNISH, OIL, LOW SHEEN, BRUSH OR SPRAY APPLICATION

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

1. SCOPE

1.1 This specification covers one type of varnish with low sheen (low gloss), intended for general interior use. It is suitable for refinishing old varnished or painted surfaces.

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:

PPP-P-1892 - Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, and Marking of.
TT-T-291 - Thinner-Paint, Volatile Spirits Petroleum Spirits.

Federal Standard:

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

(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, 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.)

Military Standard

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

(Copies of Military Specifications and Standards required by supplies 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 specified issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

Air Pollution Control District, County of Los Angeles:

Rule 66 - Organic Solvents

(Application for copies should be directed to the Air Pollution Control District, 424 South San Pedro Avenue, Los Angeles, CA 30013.)

American Society for Testing and Materials (ASTM) Standards:

- D 56 - Flash Point By Tag Closed Tester.
- D 1306 - Phthalic Anhydride Content of Alkyd Resins and Esters Containing Other Dibasic Acids Gravimetric.
- D 1475 - Density of Paint, Varnish, Lacquer and Related Products.
- D 1545 - Viscosity of Transparent Liquids by Bubble Time Method.
- D 2369 - Volatile Content of Paints.

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

3. REQUIREMENTS

3.1 Material. The material as received shall be a clear varnish, free from sediment and ready for use. It consists of phthalic anhydride, dehydrated castor oil, modified phenolic resin, necessary additives, driers, and thinner conforming to TT-T-291, type II, grade A, or a solvent system complying with Rule 66.

3.2 Quantitative requirements. The quantitative requirements shall be as specification in table I.

TABLE I. Quantitative requirements

| Characteristics | Requirements | |
|---|--------------|---------|
| | Minimum | Maximum |
| Total solids percent by weight | 35 | 40 |
| Viscosity (#4 Ford cup at 25 deg. C) | 45 | 55 |
| Weight per gallon (sounds) | 7.5 | 8.2 |
| Drying Time: | | |
| Set to touch (hours) | -- | 2 |
| Dry hard (hours) | -- | 24 |
| Gloss | 35 | 40 |
| Flash point (deg. C) | 27 | -- |
| Phthalic anhydride (percent by weight of vehicle) | 14 | -- |

3.3 Qualitative requirements.

3.3.1 Condition in container. When tested as specified in 4.4.1, a freshly opened container shall show no skinning, livering, thickening, seeding, or gelling.

3.3.2 Color. The varnish, when tested as specified in 4.4.2, shall be not darker than a solution of 0.763g of reagent-grade potassium dichromate in 100 ml of concentrated sulfuric acid (sp. gr. 1.84).

3.3.3 Appearance. The varnish shall be free from noticeable conglomerates after stirring, when tested as specified in 4.4.3.

3.3.4 Working properties and appearance of dried film. When tested as specified in 4.4.4, the varnish shall have good brushing, flowing, covering, and leveling properties. The dried film shall be of good appearance and have the characteristic gloss of interior varnish.

3.3.5 Storage stability.

3.3.5.1 Partially full container. When tested as specified in 4.4.5.1, the varnish shall not skin within 48 hours.

3.3.5.2 Full container. A full standard quart can of varnish, when tested as specified in 4.4.5.2, shall show the physical properties specified in table 1.

3.3.6 Difference in gloss. When tested as specified in 4.4.6, the varnish shall show no noticeable difference in gloss between the film applied over lacquer sealer and the film applied over varnish.

3.3.7 Water resistance. The dried film shall show no whitening, dulling, or other visible defects, when tested as specified in 4.4.7.

3.3.8 Odor. The odor of the varnish in the can, during application, and after drying shall not be abnormally offensive or disagreeable when tested as specified in 4.4.8.

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 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.

4.2.1 Lot. For the purposes of sampling, a lot of the varnish 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.

4.2.2 Sampling for 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) = 2.5 percent defective to verify compliance with this specification regarding fill, closure, and marking and other requirements not involving tests.

4.3 Inspection.

4.3.1 Inspection of containers. Each sample filled container shall be examined for defects of construction 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 to 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 represented by the sample shall be rejected.

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 of this specification. Defects shall be scored in accordance with table II. 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 11. 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. |

4.3.3 Testing of the end item. The methods of testing specified in 4.4 shall be followed. For purpose of sampling, the lot shall be expressed in units of gallons of varnish. The sample unit for testing shall be one quart of varnish, randomly selected from containers in the lot. The varnish 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:

| <u>Lot size (gallon)</u> | <u>Sample size</u> |
|--------------------------------|--------------------|
| 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 test 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 Test procedures. Unless otherwise specified, all test specimens shall be prepared and tested in a room having a temperature of 73 deg. +/- 2 F (23 deg. +/- 1 deg. C) and a relative humidity of 50 +/- 5 percent. The following tests shall be conducted in accordance with the Fed. Test Method Std. No. 141, except as otherwise specified in table III or as referred to herein.

TABLE III. Index

| Characteristics | Requirement reference | Fed. Test Method Std. No. 141 | Applicable tests | |
|------------------------------------|-----------------------|-------------------------------|------------------|---------------------|
| | | | ASTM | Paragraph reference |
| Nonvolatile content (total solids) | Table I | ---- | D2369 | ---- |
| Drying time | Table I | 4061 | ---- | ---- |
| Viscosity | Table I | ---- | D1545 | ---- |

| | | | | |
|------------------------|---------|-----------|-------|-------|
| Weight per gallon | Table I | ---- | D1475 | ---- |
| Gloss | Table I | 6101 | ---- | ---- |
| Phthalic anhydride | Table I | ---- | D1306 | ---- |
| Flash Point | Table I | ---- | D56 | ---- |
| Condition in container | 3.3.1 | 3011 | ---- | 4.4.1 |
| Color | 3.3.2 | 4241 | ---- | 4.4.2 |
| Appearance | 3.3.3 | ---- | ---- | 4.4.3 |
| Working properties | 3.3.4 | ---- | ---- | 4.4.4 |
| Storage stability | 3.3.5 | 3021,3022 | ---- | 4.4.5 |
| Difference in gloss | 3.3.6 | ---- | ---- | 4.4.6 |
| Water resistance | 3.3.7 | ---- | ---- | 4.4.7 |
| Odor | 3.3.8 | ---- | ---- | 4.4.8 |

4.4.1 Condition in container. Determine package condition of the varnish in accordance with paragraph 4.1.2 of method 3011 of Fed. Test Method Std. No. 141, and evaluate for compliance with 3.3.1.

4.4.2 Color. Determine the color of the clear varnish in accordance with method 4241 of Fed. Test Method Std. No. 141, and evaluate for compliance with 3.3.2.

4.4.3 Appearance. Pour a portion of the varnish into a clean test tube and examine by transmitted light. Evaluate for compliance with 3.3.3.

4.4.4 Working properties. Brush a thin coat of varnish on a clean smooth tin panel (see method 2012 Fed. Test Method Std. No. 141), and allow to dry at room temperature for 24 hours. Evaluate for compliance with 3.3.4.

4.4.5 Storage stability.

4.4.5.1 Partially full container. Determine skinning after 48 hours in accordance with method 3021 of Fed. Test Method Std. No. 141, and evaluate for compliance with 3.3.5.1.

4.4.5.2 Full container. In accordance with method 3022 of Fed. Test Method Std. No. 141, allow a full standard pint can to stand undisturbed for 12 months. After this period, make tests and evaluate for compliance with 3.3.5.2.

4.4.6 Difference in gloss. On one half of a 7.5 by 15 cm (3 by 6 inch) glass panel prepare in accordance with method 2021 of Fed. Test Method Std. No. 141, apply a coat of lacquer to approximately 25 μ m (0.001 inch) dry film thickness, and on the other half apply a varnish using the same procedure. Allow the panel to dry at room temperature for 24 hours. Then apply the varnish sample over the whole area, and allow to dry for 18 hours. Evaluate for compliance with 3.3.6.

4.4.7 Water resistance. Apply the varnish to tin panels, prepared as described in method 2012 of Fed. Test Method Std. No. 141, except that the panels need not be buffed, and allow to dry for 48 hours under the conditions described under paragraph 2.2.1 of method 4061 of Fed. Test Method Std. 141. Using the first panel, immerse the end which was uppermost during the drying period to a

depth of 6.3 cm (2.5 inches) in distilled water for 72 hours at room temperature. After removing the panel from the water and drying for two hours at room temperature, examine the varnish film for whitening, dulling, or other visible defects. Using the second panel, immerse the end which was uppermost during the drying period to a depth of 6.3 cm (2.5 inches) in boiling distilled water for 15 minutes. After removing the panel from the water and drying for 2 hours at room temperature, examine the varnish film for whitening, dulling, or other visible defects, and evaluate for compliance with 3.3.7. Should there be any difficulty in evaluating the results on the tin panels, check determinations shall be made on black Carrara glass, one side of which has been polished to a smooth surface. These panels shall be 7.5 by 13 (3 by 5 inches), and must be thoroughly cleaned with a suitable solvent immediately before use.

4.4.8 Odor. Note the odor of the varnish while in the container, during its application, and after drying. Evaluate for compliance with 3.3.8.

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing. Packaging and packing shall be level A, B, or C as specified (see 6.2).

5.1.1 Level A, B or C. The varnish shall be furnished in 1-pint, 1-quart, 1-, 5-, or 55-gallon quantities, as specified (see 6.2), and shall be packaged and packed in accordance with PPP-P-1892, as specified, for the applicable level.

5.2 Marking. Marking shall be in accordance with the applicable requirements of PPP-P-1892.

6. NOTES

6.1 Intended use. This varnish is intended for refinishing old varnished or painted surfaces, and can be applied by brush or regular spray. Interior varnish covered by this specification is not intended for use where rubbing properties are a prerequisite. (TT-V-86 covers cabinet rubbing varnish.)

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) Size of container required (see 5.1.1).
- (c) Marking (see 5.2).

Preparing activity:

GSA-FSS

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA-FSS
HUD-HHE

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. Price 30 cents each.

TT-V-85C
INT. AMENDMENT-2
January 18, 1983

INTERIM AMENDMENT

TO

FEDERAL SPECIFICATION

VARNISH, OIL (LOW SHEEN, BRUSH, OR SPRAY APPLICATION)

This interim amendment was developed by the General Services Administration, Office of Personal Property, Washington, DC 20406, based on currently available technical information. It is recommended that Federal agencies use it in procurement and forward recommendations for changes to the preparing activity at the address shown above.

The General Services Administration has authorized the use of this interim amendment as a valid exception to TT-V-85C, dated April 5, 1976 and Amendment - 1, dated June 23, 1977.

PAGE 2

Paragraph 2.2, Under "American Society for Testing and Materials (ASTM) Standards" delete "D 1306 - Phthalic Anhydride Content of Alkyd Resins and Esters Containing other Dibasic Acids Gravimetric" and "D 1475 - Density of Paint, Varnish, Lacquer and Related Products." Add "ASTM D 523 - Specular Gloss, ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes, and ASTM D 1544 - Color of Transparent Liquids Gardner Color Scale)."

Delete "Air Pollution Control District, County of Los Angeles:

Rule 66 - Organic Solvents and application for copies paragraph and substitute the following:

"Southern California Air Pollution Control District:

Rules 442, 443, and 102 Regulating the Use of Organic Solvents.

(Copies may be obtained from the State of California Air Resources Board, 1102 Q Street, P.O. Box 2815, Sacramento, CA 95828.)"

Paragraph 3.1; delete in its entirety and substitute the following: "3.1 Material. The varnish as received shall be clear, free from gel structures and sediment, and ready for use. The solvents shall comply with Rules 442, 443 and 102 Regulating the use of organic solvents."

Paragraph 3.3.2; delete in its entirety and substitute the following: "3.3.2 Color. When tested as specified in ASTM D 1544 the varnish shall be not darker than Gardner Liquid Color Standard No 14."

Table I, Quantitative requirements - Under "characteristics" delete "Weight per gallon (pounds)" and "Phthalic anhydride (percent by weight of vehicle). " Delete the maximum requirement of "40" under gloss and substitute "50." Delete the maximum requirement of "40" under Total solids. Add; "Lead (percent nonvolatile);" under minimum "---", and under maximum "0.06".

PAGE 4

Table III. Index - Under "characteristics" delete "Weight per gallon" and "phthalic anhydride." Under the "ASTM" column add "D 1308" for water resistance, "D 1544 for color, and "D 523" for gloss. Under "Fed. Test Method Std. No. 141" delete "6101" for gloss and add "4.4.10" under "paragraph reference." Under "Paragraph reference" delete "4.4.2" for color, under "characteristics" add reference; "Table 1", under Fed. Test Method Std. No. 141, "---"; under ASTM "---" and under paragraph reference "4.4.9".

Delete paragraph 4.4.2.

PAGE 5

Paragraph 4.4.7 - Delete in its entirety, and substitute the following:

"4.4.7 Water resistance. Draw down the varnish, using a doctor blade to a wet film thickness of 3.0 +/- 0.1 mils on a solvent-cleaned tin panel, manufacturer's standard gage No. 31. Allow to dry 48 hours at standard conditions. In accordance with ASTM D 1308, spot the varnish with boiling distilled water, cover 30 minutes, rinse with distilled water, allow 3 hours to recover, and evaluate for compliance with 3.3.7."

Add new paragraphs:

4.4.9 Lead content.

4.4.9.1 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 drawdown shall be at least 10 inches long on the sealed portion of the penetration chart. The drawdown shall be cut into discs of appropriate size to fit the sample holder of a fluorescence X-ray spectrometer.

4.4.9.2 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: ⁴¹

| 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 1) | | 33.00 | LiF(200) | Flow S.C. | Fine | 60Kv 45Ma |
| Pb (backgrd 11) | | 35.50 | LiF(200) | Flow S.C. | Fine | 60Kv 45Ma |
| Mo | K | 20.33 | LiF(200) | Flow S.C. | Fine | 60KV 45Ma |

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.

4.4.9.3 Calculation.

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

where I equals gross intensity. These results shall be compared to those obtained with 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 fluorescence spectrometers shall be set up according to the manufacturer's manual.

4.4.10 Gloss. On a sealed white test chart, draw down a film of the varnish using a doctor blade to a wet film thickness of 3.0 +/- 0.1 mils. Allow to dry 48 hours at standard conditions in a dustfree environment. Determine gloss in accordance with ASTM D 523 and evaluate for compliance with 3.2."

PREPARING ACTIVITY:

GSA - OPP