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TT-S-300A
April 25, 1977
SUPERSEDING
Fed. Spec. TT-S-300
May 3, 1963

FEDERAL SPECIFICATION

SHELLAC, CUT

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 a shellac varnish consisting of a solution or "cut"[1] of a specified type of dry lac resin in specially denatured alcohol or other suitable proprietary solvent.

1.2 Classification.

1.2.1 Type, grades, and bodies. The shellac shall be of the following types, grades, and bodies[2], as specified:

Type I - Bleached (White).

Grade A - Regular.

Body 1 - 4-pound cut.
Body 2 - 4-1/2-pound cut.
Body 3 - 5-pound cut.
Body 4 - 3-pound cut.

Grade B - Refined (De-waxed).

Body 1 - 4-pound cut.
Body 2 - 4-1/2-pound cut.
Body 3 - 5-pound cut.
Body 4 - 3-pound cut.

Type II - Orange.

Grade A - Regular.

Body 1 - 4-pound cut.
Body 2 - 4-1/2-pound cut.
Body 3 - 5-pound cut.
Body 4 - 3-pound cut.

Grade B - Refined (De-waxed).

Body 1 - 4-pound cut.
Body 2 - 4-1/2-pound cut.
Body 3 - 5-pound cut.
Body 4 - 3-pound cut.

[1] The term "cut" is defined as the number of pounds of dry lac resin (containing only the amount of moisture acceptable for proper cutting with solvent to ensure a satisfactory varnish) that were added to 3.8.1

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(1 gal) of specified solvent in manufacturing the varnish.

[2] Bodies 1, 2, 3, and 4 are sometimes designated as light, medium, heavy, and very light-body shellac varnishes, respectively.

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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 Specification:

PPP-P-1892 - Paint, Varnish, Lacquer, and Related Materials: Packaging, Packing, and Marking of.

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 Specification and Standards required by contractor 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 from 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 29 - Lac Resins, Sampling, and Testing.
D 1650 - Shellac Varnish, Sampling and Testing.

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

3. REQUIREMENTS

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3.1 Materials. Shellac varnish shall be a solution or "cut" of a specified type of dry lac resin in 95-percent (190 proof) specially denatured ethyl alcohol according to formula no. 1 of the U.S. Bureau of Internal Revenue, or in other specially denatured alcohols or proprietary solvents authorized for cutting shellac by the U.S. Bureau of Internal Revenue.

3.2 Quantitative requirements.

3.2.1 The quantitative requirements shall be as specified in table I.

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TABLE I. Quantitative requirements

Characteristics	Bleached		Orange	
	Grade A	Grade B	Grade A	Grade B
Nonvolatile matter[1], percent by weight of shellac, minimum				
Body 1	34.5	34.5	35.0	35.0
Body 2	37.0	37.0	37.5	37.5
Body 3	39.5	39.5	40.0	40.0
Body 4	28.0	28.0	28.5	28.5
Matter insoluble in specified hot solvents, percent by weight of nonvolatile, maximum	1.0	0.2	1.0	0.2
Wax, percent by weight of nonvolatile, maximum	5.5	0.2	5.5	0.2
Ash, percent by weight of nonvolatile, maximum	1.0	0.5	0.3	0.3
Iodine number, percent by weight of nonvolatile, maximum	10.0	10.0	15.0	24.5
Copals	none	none	none	none
Rosin	none	none	none	none
Drying time, in minutes, maximum:				
Set-to-touch	15	15	15	15
Dry hard	60	60	60	60

[1] Allowance has been made for 2 percent maximum moisture and other volatile matter and 3 percent insoluble matter in orange shellac, and for 6 percent moisture and other volatile matter in bleached shellac, in arriving at a minimum value.

3.3 Qualitative requirements.

3.3.1 Condition in container. When tested as specified in table II, the shellac shall not show excessive settling in a freshly-opened full container, and shall be easily re-dispersed with a paddle to a smooth, homogenous state. The shellac shall show no skinning, curdling, livering, caking, or grit.

3.3.2 Color. When tested as specified in 4.4.9, the color of the orange shellac shall not be darker than color standard D of the Lovibond Rosin Standard and the color of white shellac shall be no darker than color standard N of the Lovibond Rosin Standard.

3.3.3 Appearance of dried film. The dried film of shellac shall be homogeneous, uniform, and free from dirt, insoluble particles, and mottled and striated effects when tested as specified in 4.4.7.

3.3.4 Storage stability. When stored as specified in 4.4.8, the shellac shall show no skinning, livering, curdling, hard, dry caking or gummy sediment. In addition, the shellac shall mix readily to a smooth, homogenous state, shall meet the requirements of 3.3.2 and 3.3.3, and shall have a maximum dry hard time of 75 minutes.

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

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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.

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4.2 Inspection of preparation for delivery. The packaging, packing, and marking shall be inspected in accordance with the requirements of PPP-P-1892.

4.3 Testing of the end item.

4.3.1 Lot. The shellac shall be assembled into lots as specified in MIL-STD-105. In MIL-STD-105, the words "essentially the same condition" shall be interpreted to mean a manufacturer's batch and defined as the end product of all raw materials mixed, blended, or processed in a single operation.

4.3.2 Sampling of the end item. For the purpose 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 S-2 and an acceptable quality level (AQL) of 2.5.

4.3.3 The contractor shall submit to the contracting officer a certificate of compliance indicating that the shellac complies with the storage stability requirement as specified in 3.3.4. When certificates of compliance are submitted, the Government reserves the right to test such items to determine the validity of the certificate.

4.4 Test procedures.

4.4.1 The shellac shall be tested according to the test methods indicated in table II. Unless otherwise specified, all tests shall be performed at testing conditions which are a temperature of 23 +/- 1 deg. C (73 +/- 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 II. Test methods

Characteristic	Required Reference	Fed. Test Method Std. No. 141	ASTM Method	Test Paragraph Reference
Nonvolatile matter	Table I	----------	D 1650 [1]	-----
Matter insoluble in specified hot solvents	Table I	5221	----------	-----
Wax	Table I	5231	----------	-----
Ash	Table I	----------	D 29	4.4.2
Iodine number	Table I	----------	D 29	4.4.3
Copals	Table I	----------	----------	4.4.4
Rosin	Table I	----------	D 29	4.4.5
Drying time	Table I	4061	----------	4.4.6
Condition in container	3.3.1	3011	----------	-----
Color	3.3.2	----------	----------	4.4.9
Appearance of dried film	3.3.3	----------	----------	4.4.7
Storage stability	3.3.4	----------	----------	4.4.8

[1] Use sections 13-15 of ASTM D 1650.

4.4.2 Ash. Weigh, to the nearest 1 mg, an amount of shellac that will contain approximately 5 g of nonvolatile matter into an ignited and weigh porcelain dish or crucible. Determine ash content by the procedure outlined

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in section 18 of ASTM D 29. Calculate the percentage ash based on the nonvolatile content of varnish as follows:

$$\text{Ash, percent} = \frac{A}{B \times C} \times 100$$

Where: A = grams of ash obtained
B = grams of varnish used
C = nonvolatile matter content of the sample, expressed in decimal fraction

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4.4.3 Iodine number. Flow some of the shellac over a glass panel, prepared as specified in method 2021 of Fed. Test Method Std. No. 141. Place the plate in a nearly vertical position and allow the film of varnish to dry in a well-ventilated room at standard conditions for 1 hour. Transfer the test plate to an oven maintained at 43 +/- 2 deg. C (109 +/- 3 deg. F) and allow to dry overnight. Cool to room temperature and scrape the dry lac resin from the plate, being careful not to use to thick edges or other areas of abnormal thickness. Weigh to the nearest 0.1 mg, 0.2 g of the dry lac resin into a 250-ml glass stoppered bottle. Determine the iodine number as outlined in section 10 of ASTM D 29.

4.4.4 Copals. Adjust shellac varnishes having a nonvolatile content of more than 36 percent to 35 +/- 1 percent by adding the alcohol described in 3.1. Shellac varnishes having a nonvolatile content of less than 36 percent shall be tested as received. Filter the shellac varnish, and add about 10 ml of clear filtrate to a large test tube (150 by 20 mm). Nearly fill the test tube with 99-percent methyl alcohol, stopper the tube, and mix the contents thoroughly. The formation of a precipitate is indicative of the presence of copals.

4.4.5 Rosin. Weigh 5 to 6 g of shellac into a 2-liter Florence flask, add 20 ml of either absolute ethyl alcohol or glacial acetic acid, add 100 ml of petroleum ether, mix thoroughly, and proceed as outlined in section 11 of ASTM D 29 to test for the presence of rosin.

4.4.6 Drying time. Using a film applicator, apply shellac to a dry film thickness of .025 mm (0.001 in) to a glass panel prepared as specified in method 2021 of Fed. Test Method Std. No. 141. Varnishes having more than 36 percent nonvolatile matter shall be adjustable with the alcohol described in 3.1 to a nonvolatile content of 35 +/- 1 percent. Varnishes with a nonvolatile content of less than 36 percent shall be tested as received. Run set-to-touch and dry hard times according to method 4061 of Fed. Test Method Std. No. 141 for compliance to the requirements in table I.

4.4.7 Appearance of dried film. Using a film applicator, apply shellac to a wet film thickness of .075 mm (0.003 in) to a glass panel prepared as specified in method 2021 of Fed. Test Method Std. No. 141. Allow the panel to dry at standard conditions for 4 hours and examine for compliance to the requirement in 3.3.3.

4.4.8 Storage stability. A 1-quart container, or an equivalent amount of smaller size containers, of the shellac shall be stored in the original, unopened container or containers for 12 months from the date of manufacture at standard conditions and then shall be tested to determine compliance with the requirement in 3.3.4 (see 4.3.3).

4.4.9 Color. Fill a plastic spectrophotometric cell, which has a 1 cm path length, with the shellac to be tested. Place the cell of shellac in front of a white background. Compare the shellac in the cell with the Lovibond Rosin Standards for compliance with the requirements in 3.3.2.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing, and marking. When specified (see 6.2) the packaging, packing, and marking shall be in accordance with PPP-P-1892. The level of packaging and the level of packing shall be as specified therein. The shellac shall be furnished in 1-pint, 1-quart, or 1-gallon as specified (see 6.2).

5.2 Commercial. Unless otherwise specified (see 6.2) the packaging, packing, marking, and unitization shall be as specified in 5.2.1 thru 5.2.4.

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5.2.1 Packaging. The shellac shall be preserved and packaged in accordance with normal commercial practice.

5.2.2 Packing. The shellac shall be packed in shipping containers to insure 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.

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5.2.3 Unitization. (Applicable to full rail car and truck load shipments only.) The shellac shall be unitized for shipment 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.

5.2.4 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. Grade A (regular) orange and bleached shellac will be satisfactory for use as a productive coating for most purposes. When the quality of work warrants the use of a clear varnish practically free from impurities, grade B (refined) orange or bleached shellac shall be used.

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, grade, and body of shellac (see 1.2).
(c) Level of packaging and packing required (see 5.1).
(d) Marking required (see 5.1).
(e) Size and type of container required (see 5.1).

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TT-S-300
AMENDMENT - 3
April 14, 1972
SUPERSEDING
Amendment - 2
January 11, 1971

FEDERAL SPECIFICATION

SHELLAC, CUT

This amendment, which forms a part of Federal Specification TT-S-300, dated May 3, 1963, was approved by the Commissioner, Federal Supply Service, General Service Administration for the use of all Federal agencies.

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Insert the following before REQUIREMENTS:

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.

Nongovernmental:

National Motor Freight Traffic Association, Incorporated, Agent:

National Motor Freight Classification.

(Application for copies shall be addressed to the American Trucking Association, Inc., Tariff Order Section, 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.)

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Paragraph 5.1 Delete in its entirety and substitute:

5.1 Packaging, packing, and marking. Unless otherwise specified, the packaging, packing, and marking shall be in accordance with TT-P-143. The levels of packaging and packing shall be A, B, or C as specified (see 6.2). When specified in the contract or purchase order (see 6.2), the shellac shall be furnished in either plastic lined containers or polyethylene bottles of 1-oz.; 1/2 pint; 1-pint; 1-quart; and 1-gallon sizes providing that they will assure carrier acceptance and safe arrival at destination in compliance with the Uniform Freight Classification or The National Motor Freight Classification.

Paragraph 6.2 Delete in its entirety and substitute:

6.2 Ordering data. The type, grade, the body of the varnish, and the type (plastic lined or polyethylene bottles) and unit size container desired should be specified in the invitation for bids, contract or purchase order (see 1.2.1, 3.1.1, 3.1.2, 3.2.1, 5.1, 6.3, and 6.6).

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