

TT-L-58E  
 October 26, 1978  
 SUPERSEDING  
 TT-L-58D  
 January 7, 1971

FEDERAL SPECIFICATION

LACQUER: SPRAYING, CLEAR AND PIGMENTED  
 FOR INTERIOR USE

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 clear and pigmented spray lacquers for interior use. The lacquers are furnished in gloss or semi-gloss finishes.

1.2 Classification.

Type I - Clear.

Class 1 - Gloss.  
 Class 2 - Semi-gloss.

Type II - Pigmented.

Class 1 - Gloss.  
 Class 2 - Semi-gloss.

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-266 - Thinner, Dope and Lacquer (Cellulose-nitrate).  
 PPP-B-636 - Boxes, Shipping, Fiberboard.  
 PPP-C-96 - Cans, Metal, 26-Gage and Lighter.

Federal Standards:

Fed. Test Method Std. No. 141 - Paint, Varnish, Lacquer and Related Materials;  
 Method 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, 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 General Services Administration Business Service Centers in Boston; New York; Philadelphia; Washington, DC; Atlanta; Chicago; Kansas City, MO; Fort Worth; Houston; 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.)

TT-L-58E

Military Standard:

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

(Copies of Military Specifications and Standards required by contractors 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 National Standards Institute (ANSI) Standards:

MH2.15 - 5-Gallon Nesting Lug-Cover Universal Pail (DOT-37A80, DOT-37A60, UFC Rule 40, NMFC - Item 260).

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018).

American Society for Testing and Materials (ASTM) Standards:

- D 523 - Specular Gloss.
- D 1200 - Viscosity of Paints, Varnishes, and Lacquers by Ford Viscosity Cup.
- D 1210 - Fineness of Dispersion of Pigment - Vehicle Systems.
- D 1364 - Water in Volatile Solvents (Fisher Reagent Titration Method).
- D 1544 - Color of Transparent Liquids (Gardner Color Scale).
- D 1644 - Nonvolatile Content of Varnishes.
- D 1729 - Visual Evaluation of Color Differences of Opaque Materials.
- D 2805 - Hiding Power of Paints.
- D 3272 - Vacuum Distillation of Solvents from Solvent Base Paints.

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

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 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.)

## 3. REQUIREMENTS

3.1 Solvent analysis. When tested as specified in 4.4.1, the solvent shall conform to the following requirements by volume:

- (a) Aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent maximum.
- (b) Ethylbenzene and toluene: 20 percent maximum.
- (c) Solvent with olefinic or cyclo olefinic unsaturation: negative test.
- (d) Aldehydes and branched chain ketones: negative test.
- (e) Halogenated compounds: negative test.
- (f) Total of (a) plus (b): 20 percent maximum.

3.2 Quantitative requirements. The quantitative requirements of the lacquer shall be as specified in table I.

TT-L-58E

TABLE I. Quantitative requirements

Characteristics	Requirements	
	minimum	maximum
Nonvolatile content, percent by weight of lacquer, type I only	26	
Viscosity, No. 4 Ford Cup, seconds	15	35
Drying time:		
Dust free, minutes		5
Tack free, minutes		10
Dry through, hours		2
After tack 1/		
Water content, percent by weight of lacquer		0.5
Coarse particles and skins, percent by weight of lacquer		1.0
Fineness of grind	6	
Specular gloss, 60°		
Semi-gloss finishes	40	60
Gloss finishes	75	
Dry opacity, at 0.025 mm (0.001 in) dry film thickness on a smooth-surface paper chart, type II		
Reds and yellow	85	
White	90	
All other colors	98	
Lead content, percent by weight of total nonvolatiles		0.06

1/ The film shall be free from after tack when tested 24 hours after application and shall remain free from after tack for 7 days.

### 3.3 Qualitative requirements.

3.3.1 Condition in container. When tested as specified in 4.4.3, the lacquer shall be free from grit, skins, needs, lumps, liveness, and any settling shall be redispersible by hand stirring with a paddle to a homogeneous state. In addition, the type I lacquer shall be clean, clear, and contain no sediment or gelation.

3.3.2 Spraying properties. When tested as specified in 4.4.4, the lacquer shall level out to a smooth, uniform coating which is free of any defects.

3.3.3 Flexibility. When tested as specified in 4.4.5, the dried film of the lacquer shall show no cracking or flaking from the metal.

3.3.4 Knife test. When tested as specified in 4.4.6, the dried film of the lacquer shall adhere tightly to the metal and shall not flake or powder, and the cut shall show beveled edges.

3.3.5 Self-lifting. When tested as specified in 4.4.7 the lacquer shall not be self-lifting, and there shall be no evidence of wrinkling.

3.3.6 Resistance to alcohol, hydrocarbons, and water. When tested as specified in 4.4.8, the dried film of the lacquer shall show no softening, wrinkling or blistering 24 hours after the hydrocarbon and water immersion. The film shall retain a minimum of 90 percent of the original gloss.

3.3.7 Blushing. When tested as specified in 4.4.9, the lacquer shall show no discoloration or streaking.

### 3.3.8 Color.

3.3.8.1 When tested as specified in 4.4.10.1, the type I lacquer shall be not darker than Gardner Color Standard Number 6.

3.3.8.2 When tested as specified in 4.4.10.2, the type II lacquer shall match the specified color of Fed. Std. No. 595.

TT-L-58E

## 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.

4.2 Examination of preparation for delivery. An examination shall be made to determine compliance with the requirements of section 5. The sample unit shall be one shipping container fully prepared for delivery. Sampling shall be in accordance with MIL-STD-105. The inspection level shall be S-2 with an AQL of 4.0 expressed in terms of percent defective.

4.3 Sampling and inspection for acceptance.

4.3.1 Lot. For the purpose of sampling, a lot of the lacquer 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.

4.3.2 Sampling for testing. Sampling shall be in accordance with MIL-STD-105. The lot shall be expressed in units of gallons. The inspection level shall be S-2 and the AQL shall be 4.0 defects per hundred units.

4.4 Test methods. All tests shall be conducted in accordance with the methods specified in table II to determine compliance with the requirements of section 3. Unless otherwise specified, all tests shall be conducted at standard conditions which are  $25^{\circ} + 1^{\circ}$  C and a relative humidity of  $50 + 5$  percent. All test reports shall contain the individual values utilized in expressing the final result. Failure to pass any test, or noncompliance with any requirement shall be cause for rejection of the sample.

TABLE II. Index

Characteristics	Requirement paragraph	Applicable tests		Test paragraph
		Fed. Test Method Std. No. 141 or ASTM method		
Solvent	3.1	D 3272		4.4.1
Nonvolatile content	Table I	D 1644		-
Viscosity	Table I	D 1200		-
Drying time	Table I	4061		-
Water content	Table I	D 1364		-
Coarse particles and skins	Table I	4092		-
Fineness of grind	Table I	D 1210		-
Specular gloss	Table I	D 523		-
Dry opacity	Table I	D 2805		-
Lead content	Table I	-		4.4.2
Condition in container	3.3.1	3011		4.4.3
Spraying properties	3.3.2	4331		4.4.4
Flexibility	3.3.3	6221		4.4.5
Knife test	3.3.4	6304		4.4.6
Self-lifting	3.3.5	-		4.4.7
Resistance to alcohol, hydrocarbon, and water	3.3.6	-		4.4.8
Blushing	3.3.7	-		4.4.9
Color	3.3.8	D 1544/D 1729		4.4.10

4.4.1 Solvent analysis.

4.4.1.1 Solvent extraction. The solvent shall be extracted from the lacquer in accordance with ASTM Method D 3272.

4.4.1.2 Aromatic compounds and branched - chain ketones. The presence of aromatic hydrocarbons and branched - chain ketones shall be determined in accordance with method 7360 of Fed. Test Method Std. No. 141.

TT-L-58E

4.4.1.3 Olefins. The presence of olefins shall be determined in accordance with of method 7356 of Fed. Test Method Std. No. 141.

4.4.1.4 Aldehydes. The presence of aldehydes shall be determined as follows: Dissolve 1 gr of silver nitrate in 20 ml of distilled water. Add a 10 percent solution of ammonium hydroxide, dropwise, until the precipitate is almost dissolved. Filter, and store the ammoniacal silver nitrate solution in a dark amber, tightly-stoppered bottle. Place 10 ml of the solvent separated in 4.4.1.1 in a glass stoppered flask and add 5 ml of the solution. Mix thoroughly by gentle swirling and allow to stand in a dark chamber maintained at  $50^{\circ} \pm 2^{\circ}$  C for 15 minutes. If no brown color or precipitate of silver is produced, the solvent shall be considered free from aldehydes.

4.4.1.5 Halogenated compounds. The presence of halogenated compounds shall be determined in accordance with method 5132 of Fed. Test Method Std. No. 141.

4.4.2 Lead content. The method described in 4.4.2.1 or the method described in 4.4.2.2, shall be used. The X-ray fluorescence spectrometry method described in 4.4.2.1 shall be the final determinant of compliance in all cases.

4.4.2.1 Analysis for lead by X-ray fluorescence spectrometry. 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. The molybdenum X-ray source shall be operated at 60 Kv and 45 Ma; a lithium fluoride crystal cut along the 200 planes shall be used to disperse fluorescent X-rays; the detector collimator shall be set at fine; and flow and scintillation counters shall be used as detectors. Pulse height selection shall be used in all measurements, and the counting time shall be 100 seconds. Place the sample disc in the sample holder, and measure the count rates of lead, lead background, and the molybdenum Rayleigh-scattered background from the X-ray tube at the following angles:

<u>Analytical Line</u>	<u>Angle</u>	<u>Intensity</u>
Mo	20.33	I <sub>Mo</sub>
Background I	33.50	I'
Pb	33.93	I <sub>Pb</sub>
Background II	34.50	I''

4.4.2.1.1 Calculation. Determine the ratio R of the lead and molybdenum lines as follows:

$$R = \frac{2I_{Pb} - I' - I''}{2I_{Mo}}$$

4.4.2.1.2 Procedure. Duplicate drawdowns of the well-mixed paint shall be made on the sealed portion of a standard paint penetration chart, using a mechanical applicator plate and a film applicator with a 150  $\mu$ m gap. The drawdowns shall be at least 250mm long, and shall be allowed to air-dry for 24 hours at standard conditions. Discs shall then be cut from each drawdown to fit the sample holder of an X-ray fluorescence spectrometer. Standard samples of the same type of paint containing known amounts of lead shall be prepared and measured in the same way, and the R values shall be plotted against the lead concentration to obtain a working curve. By use of the working curve, the value of R obtained for the test sample shall be converted to the lead concentration in percent by weight, and the result shall be evaluated for compliance with the requirement in table I.

4.4.2.2 Analysis for lead by atomic absorption spectrometry. ASTM Method D3335 shall be used to determine the concentration of lead in percent by weight, and the result shall be evaluated for compliance with the requirement in table I.

4.4.3 Condition in container. The lacquer sample, as received, shall be examined in accordance with method 3011 of Fed. Test Method Std. No. 141 for compliance with 3.3.1

TT-L-58E

4.4.4 Spraying properties. The lacquer shall be reduced in accordance with manufacturer's directions using a thinner conforming with TT-T-266. Spray the lacquer on a steel panel, prepared in accordance with method 2011 of Fed. Test Method Std. No. 141 to a dry film thickness of  $25 + 3 \mu\text{m}$ . Observe for spraying properties in accordance with method 4331 of Fed. Test Method Std. No. 141. The lacquer shall not clog the gun. Check for compliance with 3.3.2.

4.4.5 Flexibility. Test as specified in method 6221 of Fed Test Method Std. No. 141. The lacquer shall be applied on a tin plate panel with a draw-down blade to a dry film thickness of  $25 + 3 \mu\text{m}$ . Dry the panel for 96 hours at standard conditions and bend over a 6.3 mm (0.25-in) mandrel. Check the panel for compliance with 3.3.3.

4.4.6 Knife test. Test as specified in method 6304 of Fed. Test Method Std. No. 141, using the flat portion of the panel used for the flexibility test. Check for compliance with 3.3.4.

4.4.7 Self-lifting. Spray a coat of the lacquer onto three tin plate panels prepared in accordance with method 2012 of Fed. Test Method Std. No. 141. After drying at standard conditions for 4, 24, and 96 hours respectively, spray a second coat of the lacquer onto each panel. After 15, 60, and 180 seconds, and again after 4 hours, check for compliance with 3.3.5.

4.4.8 Resistance to alcohol, hydrocarbons, and water. Prepare three tin plate panels as specified in 4.4.5, and let dry for 48 hours at standard conditions before testing.

4.4.8.1 Resistance to alcohol. Place 0.25 ml of 50 percent aqueous ethyl alcohol on a coated panel. Allow the alcohol to evaporate and polish the exposed spot with a soft cloth. Check for compliance with 3.3.6.

4.4.8.2 Resistance to hydrocarbons. Immerse half of a coated panel in a beaker containing 70 percent by volume of iso-octane and 30 percent by volume of toluene for 4 hours. Dry the panel and, after 30 minutes, check for compliance with 3.3.6.

4.4.8.3 Resistance to distilled water. Immerse half of a coated panel in a beaker containing distilled water at  $25^{\circ}\text{C}$  for 18 hours. Dry the panel and, after 2 hours, check for compliance with 3.3.6.

4.4.9 Blushing. Prepare a tin plate panel and apply lacquer, as specified in 4.4.5. Dry for 24 hours at  $30^{\circ} + 1^{\circ}\text{C}$  and  $80 + 2$  percent relative humidity. Apply a second coat of lacquer to the same film thickness and dry for 24 hours under the same conditions. Then check for compliance with 3.3.7.

#### 4.4.10 Color.

4.4.10.1 The type I lacquer shall be tested in accordance with ASTM method D 1544 for compliance with 3.3.8.1.

4.4.10.2 The type II lacquer shall be sprayed to a steel panel prepared in accordance with method 2011 of Fed. Test Method Std. No. 141. Apply the lacquer to complete hiding. Dry at standard conditions for 24 hours and determine the color by ASTM method D 1729 for compliance with 3.3.8.2.

### 5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or commercial, as specified (see 6.2).

5.1.1 Level A. The lacquer shall be furnished in 1-pint, 1-quart or 1-gallon quantities packaged in metal cans conforming to PPP-C-96, type V, class 2. Five gallon quantities of lacquer shall be furnished in metal pails conforming to ANSI Standard MH2.15, 24-gage. Exterior plan B coating and side seam striping shall be required. The 1-gallon cans shall be provided with wire handles which shall be galvanized or otherwise protectively coated to resist corrosion.

5.1.2 Commercial. The 1-pint, 1-quart, 1-gallon, and 5-gallon quantities of lacquer shall be packaged in accordance with normal commercial practice. The complete package shall be designed to protect the item against damage during shipment, handling, and storage.

TT-L-58E

5.2 Packing. Packing shall be level A or commercial, as specified (see 6.2).

5.2.1 Level A. Forty-eight 1-pint cans, twelve 1-quart cans, or four 1-gallon cans of lacquer, packaged as specified in 5.1.1 shall be packed in close-fitting boxes conforming to PPP-B-636, grades V3C, V3s, or V2s. The boxes shall be closed, waterproof, and reinforced in accordance with the appendix of PPP-B-636. Alternatively, wirebound, cleated plywood, or nailed wood boxes shall be acceptable shipping containers when lined with a waterproof barrier material. The barrier material shall be sealed at the edges with waterproof tape or adhesive.

5.2.2 Commercial. The lacquer shall be packed in a manner that will assure acceptance by common carrier and provide product protection against loss and damage during multiple shipments, handling, and storage. The shipping container shall be in compliance with the National Motor Freight Classification and Uniform Freight Classification.

5.3 Marking. Marking shall be as specified in the contract or order.

## 6. NOTES

6.1 Intended use. The lacquer covered by this specification is intended for interior use as a finishing coat over primed metal or sealed wood surfaces.

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 and class required (see 1.2).
- (c) Applicable levels of packaging and packing required (see 5.1 and 5.2).
- (d) Size of container required (see 5.1.1).

### Preparing activity:

GSA-FSS

### Military Custodians:

Army - MR

### Review Activity:

Army - EA

U. S. GOVERNMENT PRINTING OFFICE : 1970 - 281-172-1248  
 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.

