TT-L-20a
April 25, 1967
SUPERSEDING
Fed. Spec. TT-L-20
July 2, 1963

FEDERAL SPECIFICATION

LACQUER, CAMOUFLAGE

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

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers a lacquer for use on metal surfaces as a camouflage color finish.

1.2 Classification.

1.2.1 Grade and colors. This specification covers one grade of camouflage lacquer in the colors, as specified in table II. The color number of Fed. Std. No. 595 shall be specified.

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:

QQ-A-250/5 —Aluminum Alloy Alclad 2024, Plate and Sheet.
TT-B-838 —Butyl Acetate; Normal (for Use in Organic Coatings).
TT-B-846 —Butyl Alcohol; Normal (Butanol) (For Use in Organic Coatings).
TT-E-776 —Ethylene Glycol Monobutyl Ether (For Use in Organic Coatings).
TT-I-735 —Isopropyl Alcohol.
TT-M-268 —Methyl Isobutyl Ketone (For Use in Organic Coatings).
TT-N-350 —Nitrocellulose, Technical (For Use in Organic Coatings).
TT-P-143 —Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, and Marking of.
TT-P-346 —Pigment, Chrome-Yellow and Chrome-Orange; Dry.
TT-P-410 —Pigment, Molybdate Orange.
TT-P-442 —Pigment, Titanium Dioxide, (For Protective Coatings).
TT-S-735 —Standard Test Fluids; Hydrocarbon.
TT-T-266 —Thinner; Dope and Lacquer (Cellulose-Nitrate).
TT-T-548 —Toluene; Technical.

Federal Standards:

Fed. Test Method Std. No. 141—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 product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, and Auburn, Washington.

(Federal Government activities may obtain copies of Federal Specifications and Standards and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

MIL-C-8514—Coating Compound, Metal Pretreatment, Resin-Acid.
MIL-P-8585—Primer Coating, Zinc Chromate, Low-Moisture-Sensitivity.
MIL-A-8625—Anodic Coatings, for Aluminum and Aluminum Alloys.

(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.)

3. REQUIREMENTS

3.1 Composition. The composition shall conform to the percentage by weight as given in table I.

TABLE I. Composition—percent by weight

Product	Nonspecular colors [1]		Semi-gloss colors [2]	
	Percent (minimum)	Percent (maximum)	Percent (minimum)	Percent (maximum)
Volatile	--	55	--	60
Nonvolatile [3]	45		40	--
Volatile content, [4] as % of volatile				
Total esters and/or ketones	35	--	35	--
Medium-boiling [5]	23	--	23	--
Total alcohols	15	22	15	22
Medium-boiling [5]	6	--	6	--
Hydrocarbons (Aromatic) [6]	--	50	--	50
Toluene	30		30	--
Nonvolatile content, as % of nonvolatile				
Pigment	--	60	--	50
Vehicle solids	40	--	50	--

Vehicle solids composition—percent by weight of vehicle solids	All colors	
	Percent (minimum)	Percent (maximum)
Nitrocellulose compounds	25	30
Resins	53	61
Plasticizers	14	17
Phthalic anhydride	19	--

[1] Colors having table III gloss requirements up to a maximum of 5.
[2] Colors having table III gloss requirements of a minimum of 8 or higher and semigloss sea blue.
[3] The nonvolatile content for black, shall be 37 percent minimum and for insignia blue 40 percent minimum.
[4] The minimum boiling point of volatile portion shall be not less that 70° C. (158° F).
[5] Boiling above 108° C. (226.4° F.).
[6] Aliphatic hydrocarbons shall not be used.

3.2 Ingredients. All ingredients used in the manufacture of these products shall conform to the following.

3.2.1 Cellulose nitrate. The cellulose nitrate shall conform to type III, of TT-N-350.

3.2.2 Resins. Resins shall be non-drying coconut oil modified phthalic alkyds, containing a minimum of 37 percent phthalic anhydride. The use of rosin or phenol shall be prohibited.

3.2.3 Plasticizers. Chemical plasticizers, if used, shall be organic phosphates and phthalates, having a minimum boiling point of 215° C. at 5 mm. pressure.

3.2.4 Pigments. Pigments listed in table II, or any combination thereof, shall make up the basic pigmentation for the color specified. To exactly match the required color other tinting pigments may be used provided such additional pigments have good outdoor durability. Titanium dioxide shall be rutile, chalk resisting type conforming to TT-P-442 type III. The flatting pigment shall not exceed that required to produce the specified gloss values. Based on the total pigment content, the flatting pigments shall not exceed 85 percent for black and instrument black, 70 percent for bright red, insignia blue, nonspecular and semi-gloss sea blue, seaplane gray and sea gray and 50 percent for each of the other colors. The flatting pigments shall be siliceous matter. Calcium sulfate and metallic soaps are prohibited except that metallic soaps may be used as an aid to grinding in an amount not to exceed 1 percent of the total pigments.

TABLE II.

Color Name	Color No. Fed. Std. No. 595	Pigments (except flatting pigments)
Dull red	30109	Red iron oxide, yellow iron oxide.
Maroon	30111	Titanium dioxide, red iron oxide, yellow iron oxide, carbon or lamp black.
Dark Earth (Field drab)	30118	Red iron oxide, yellow iron oxide, carbon or lamp black, titanium dioxide.
Earth yellow	30257	Titanium dioxide, red iron oxide, yellow iron oxide, carbon or lamp black.
Middlestone	30266	Chrome-yellow, chrome orange, yellow iron oxide, titanium dioxide.
Sand	30277	Titanium dioxide, red iron oxide, yellow iron oxide, carbon or lamp black.
Bright red	31136	Bon maroon [1], molybdate orange conforming to TT-P-410.
Orange	32216	Chrome orange (lightfast) [2], molybdate orange (lightfast) [2], yellow iron oxide, chrome yellow (lightfast) [2].
Orange-yellow	33538	Chrome yellow (lightfast) [2], chrome orange (lightfast) [2], molybdate orange, (lightfast) [2].
Olive drab	X-34087	Red or yellow iron oxide, medium chrome yellow, titanium dioxide, phthalocyanine blue, iron blue, chrome orange, chrome green oxide, molybdate orange, antimony sulfide.
Medium green (Navy)	34092	Chrome-yellow or chrome orange, titanium dioxide, antimony sulfide, yellow iron oxide; chrome green oxide.
Medium green (Army)	34102	Chrome green, red or yellow iron oxide, chrome yellow, carbon black, iron blue and chrome yellow for green [3].
Green	34108	Chrome green, iron blue and chrome yellow for green [3].
Interior green	34151	Chrome yellow, chrome orange, titanium dioxide, carbon black yellow iron oxide, chrome green oxide.
Blue drab	34158	Phthalocyanine blue, titanium dioxide, carbon or lamp black, chrome yellow.
Semi-gloss sea blue	25042	Iron blue, titanium dioxide, carbon or lamp black.
Nonspecular sea blue	35042	Iron blue, titanium dioxide, carbon or lamp black.
Insignia blue	35044	Iron blue, titanium dioxide, carbon or lamp black, red iron oxide.
Medium blue	35109	Iron blue, titanium dioxide, carbon or lamp black, yellow iron oxide.
Light blue	35193	Iron blue, titanium dioxide, chrome yellow.
Sea gray	36118	Titanium dioxide, carbon or lamp black, iron blue.
Ocean gray	36176	Titanium dioxide, carbon or lamp black, milori blue, phthalocyanine blue.
Seaplane grap	26081	Titanium dioxide, carbon or lamp black, pure iron dioxide.
Dark gull gray	36231	Titanium dioxide, carbon or lamp black, yellow or red iron oxide.
Light gull gray	36440	Titanium dioxide, carbon or lamp black.
Instrument black	27038	Carbon or lamp black, iron blue.
Black	37038	Black iron oxide, carbon or lamp black.
Purple	37144	Titanium dioxide, thioindigoid maroon.
Semi-gloss insignia white [4]	27875	Titanium dioxide.
Insignia white [4]	37875	Titanium dioxide.

[1] Manganese precipitate of Color Index No. 48 Permanent Red; otherwise known as Permanent Red—2B Manganese.
[2] Pigment conforming to TT-P-346 may not be satisfactory. The proprietary lightfast chrome yellows and chrome oranges are satisfactory.
[3] A special chrome yellow for use with iron blue to match chrome green.
[4] These colors shall contain no tinting pigments whatsoever; siliceous extenders shall be commercial white color. A color that is whiter, i.e. has higher reflectance than color chip No. 27875 or No. 37875 as applicable is acceptable (see table III for minimum reflectance requirement).

3.2.5 Solvents. Only those solvents, in the ratios indicated, which are specified in Table I shall be used in the manufacture of the product. The finished lacquer shall be capable of being thinned for use with thinner conforming to TT-T-266.

3.3 Qualitative requirements.

3.3.1 Condition in container. When tested as in 4.3.2 the packaged material shall pour freely without stirring. The lacquer, in a freshly opened full container, shall show no grit, skinning, curdling, livering or excessive pigment flotation, and shall show no more settling or caking than may be easily redispersed with a paddle to a uniform and homogeneous condition.

3.3.2 Accelerated storage stability.

3.3.2.1 Lacquer as packaged. When tested as in 4.3.3.1 the package material shall show no livering, curdling, hard caking nor tough gummy sediment and shall mix readily to a smooth homogeneous state.

3.3.2.2 Reduced lacquer. When tested as in 4.3.3.2 the aged lacquer shall produce a film on glass showing no seediness nor clear areas lacking color.

3.3.3 Odor. When tested as in 4.3.2 the odor of the lacquer, wet or dry, shall not be objectionable. A air-dried film shall retain no residual odor 48 hours after application.

3.3.4 Color. When tested as in 4.3.4 the color of the lacquer film, shall match that of the standard color chip in Fed. Std. No. 595 except that the white shall meet the directional reflectance of table III.

3.3.5 Working properties. When tested as in 4.3.5, the lacquer under test shall have working properties equal to or better than those exhibited by a simultaneously tested sample of the control lacquer of the corresponding color. When reduced to spraying consistency and applied to a smooth, vertical, metal surface, two normal coats of the lacquer under test shall show good working properties and dry to a uniform, smooth surface free of runs, sags, bubbling, wrinkling, streaking, or other defects.

3.3.6 Dilution stability. When tested as in 4.3.6 the lacquer shall show no incompatibility as evidenced by curdling, precipitation or separation. Pigment settling shall not be cause for rejection.

3.3.7 Self-lifting properties. When tested as in 4.3.7 the panels shall show no evidence of lifting in the system.

3.3.8 Drying time. When tested as in 4.3.2 the lacquer shall dry hard in not more than 40 minutes.

3.3.9 Surface appearance. When tested as in 4.3.8 the lacquer film shall be free from blushing, streaks, blisters, coarse particles, silking, or other irregularities of surface.

3.3.10 Print resistance. When tested as in 4.3.9 the lacquer shall show no permanent print from cheesecloth.

3.3.11 Primer absorption and lacquer resistance. When tested as in 4.3.10 the lacquer shall show no tendency to sink the control formula primer, or impair the adhesion of the system to metal. The lacquer shall not develop embrittlement or film irregularities through a combination with the primer when compared with the control lacquer of the corresponding color.

3.3.12 Coating anchorage. When tested as in 4.3.11 the lacquer film shall cut loose in the form of a ribbon without flaking or separation from the primer. The coating anchorage of the lacquer under test shall be equal to or better than that exhibited by a simultaneously tested control lacquer of the corresponding color.

3.3.13 Baking properties. When tested as in 4.3.12 the lacquer film, shall show no greater color change than that exhibited by a simultaneously tested sample of the control lacquer of the corresponding color.

3.3.14 Flexibility. A panel prepared and tested as in 4.3.13 shall withstand bending without cracking or flaking.

3.3.15 Flexibility (cold cracking). A panel prepared and tested as in 4.3.14 shall withstand bending without cracking or flaking.

3.3.16 Polishing test. When tested as in 4.3.15, the gloss values of the lacquers, except semi-gloss white, shall be not greater than three times the initial values.

3.3.17 Toxicity. The manufacturer shall certify that the lacquer shall have no adverse effect on the health of personnel when used according to provided instructions and for its intended purpose. Questions pertinent to this effect shall be referred by the procuring activity to the appropriate departmental medical service who will act as an advisor to the procuring agency.

3.4 Quantitative requirements. The camouflage lacquer shall comply with the requirements specified in table III.

TABLE III. Quantitative requirements

Requirements	Minimum	Maximum
Fineness of grind	5	--
Coarse particles (retained on a No. 325 sieve)		
Percent by weight of total lacquer	--	0.1
Viscosity, No. 4 Ford cup, seconds	--	27
Weight per gallon, pounds		
37038 Black	7.5	--
All other colors	8.0	--
Specular gloss, 60°		
Semigloss colors		
34151 Interior green	12	17
25042 Semigloss sea blue	5	8
26081 Seaplane gray	8	12
27038 Instrument black	12	17
27875 Semigloss insignia white	40	55
Nonspecular colors		
30118 Dark earth	--	2
30266 Middlestone	--	3
31136 Bright red	--	3
X34087 Olive drab	--	3
34092 Medium green (Navy)	--	3
35042 Nonspecular sea blue	--	3
35044 Insignia blue	--	3
36118 Sea gray	--	2
36231 Dark gull gray	--	3
37038 Black	--	2
All other colors	--	5
Daylight 45°, 0° directional reflectance		
37875 insignia white and 27875 semi-gloss insignia white	82	--
Hiding power (dry film thickness 1 mil.)		
Contrast radio (percent) (see 4.3.18)		
37875 Insignia white	88	--
27875 Semi-gloss insignia white	88	--
33538 Orange yellow	88	--
31136 Bright red	88	--
All other colors	98	--
Infrared reflectance, percent		
X34087 Olive drab	28	55
34092 Medium green (Navy)	28	55

3.5 Resistance properties.

3.5.1 Blush resistance. When tested as in 4.3.20 the lacquer shall have sufficient resistance to the precipitating action of high humidity to prevent the formation of streaks and discoloration and shall be equal to that exhibited by a simultaneously tested sample of the control lacquer of the corresponding color.

3.5.2 Water resistance. When tested as in 4.3.21 the lacquer under test shall show no checking, blistering, or whitening. A slight whitening or dulling which may be removed by light wiping with a soft cloth shall not be cause for rejection. The immersed film shall in all respects, be equal to that exhibited by a simultaneously tested sample of the control lacquer of the corresponding color

3.5.3 Hydrocarbon resistance. When tested as in 4.3.22 the lacquer under test shall show no blistering or film failure. Slight gumming above the level of immersion in the test fluid, shall not be cause for rejection. Twenty-four hours after removal from the test fluid, the lacquer shall be equal in hardness, toughness, gloss, and anchorage to the film of a simultaneously tested sample of the control lacquer of the corresponding color.

3.5.4 Weather resistance. The lacquer furnished under this specification shall be a formulation which has been tested as in 4.3.23 and shown no greater film deterioration, chalking, or color change at any time during the exposure period than that exhibited by a simultaneously exposed sample of the control lacquer of the corresponding color. The panels shall be examined at the end of 3 months, and at any time thereafter. The test shall be terminated upon evidence of failure of the lacquer under test to meet the requirements of this specification.

3.5.5 Anchorage (tape test). When tested as in 4.3.24 the lacquer under test shall show no greater removal from the primer, nor the entire system from the panel, than that exhibited by a simultaneously tested sample of the control lacquer of the corresponding color.

3.6 Workmanship. The component ingredients shall be intimately assembled and processed as required in accordance with the best practice for the manufacture of high-quality lacquer.

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, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Sampling and inspection. Sampling and inspection shall be performed in accordance with section 1000 of Fed. Test Method Std. No. 141.

4.2 Classification of tests. The testing of the lacquer shall be for quality conformance. The right is reserved to make any additional tests deemed necessary to determine that the lacquer meets the requirements of the specification.

4.3 Test methods.

4.3.1 Test conditions. The routine and referee testing conditions shall be in accordance with section 7 of Fed. Test Method Std. No. 141, and as described herein.

4.3.1.1 Test panels. Except as otherwise specified herein, all panels used for test purposes shall be aluminum-clad aluminum alloy conforming to QQ-A-250/5, 0.020 by 3 by 6 inches in size and anodized in accordance with MIL-A-8625, type I. The panels shall be finished as follows: Spray one coat of wash primer, MIL-C-8514 to a dry film thickness of 0.0002 to 0.0003 inch and airdry for 30 minutes. The control formula product of the zinc chromate primer conforming to MIL-P-8585 shall be diluted 1 part primer to 2 parts toluene, by volume, and shall then be applied to each test panel (0.0003—0.0004 inch, dry film thickness) and shall be dried for 2 hours unless otherwise specified. The sample of the lacquer under test shall be reduced with an equal volume of thinner conforming to table IV. Two spray coats of the reduced lacquer under test shall be applied over the primer, each coat at a dry-film thickness of 0.5 ± 0.1 mil. The first coat shall dry 30 minutes before application of the second coat. The total dry-film thickness of the two lacquer coats shall be 1.0 ± 0.2 mil. The system shall air-dry for 24 hours, unless otherwise specified, before subjection to test.

TABLE IV

Lacquer thinner

Ingredients	Percent by weight
Methyl isobutyl ketone (TT-M-268)	35
Isopropyl alcohol (99.5 percent) (TT-I-735)	6
Butyl alcohol (TT-B-846)	9
Toluene (TT-T-548)	50

4.3.1.2 Control formula lacquer. The control formula lacquer of table V is for light gull gray color. Lacquers made in other colors shall be formulated from the vehicle solids portion called out in table V, except for the pigments which shall be in accordance with table II. All control lacquers shall meet all the requirements of this specification. The table V formulation with the specified proprietary raw materials represents a product of established outdoor weathering durability. The listing of these proprietary materials is not to be construed as an endorsement thereof or as precluding acceptance of lacquers formulated with raw materials from other proprietary sources or other formulations within the compositional framework of tables I and II. Such products may prove equivalent or even superior in performance to the test lacquer. However, the table V formulation should be employed as the comparison standard, for control purposes.

TABLE V. Light gull gray test lacquer

Ingredients	Weight in grams
Titanium dioxide (duPont R610)	198
Lampblack	2
Silica (Johns Manville Celite 266)	63
Magnesium silicate (Whitaker, Clark and Daniels SF Talc 399)	137
Alkyd resin (Rohm and Haas Duraplex ND78, 60 percent in xylene)	385
Trioctyl phosphate	64
Toluene	135
Ethyl alcohol	45
Butyl alcohol	5
Ethyl acetate	40
	1074

Grind the above materials in a 1-gallon capacity pebble mill, previously filled to about ⅓ its capacity with approximately ½ inch diameter flint pebbles, for 18 hours. Then add 700 grams of the following nitrocellulose solution and grind for an additional ½ hour.

Ingredients	Grams
5 to 6 second nitrocellulose (70% solids wet with isopropyl or ethyl alcohol)	151
Methyl isobutyl ketone	329
Butyl alcohol	55
Toluene	165
	700

4.3.2 The tests in table VI shall be conducted in accordance with Fed. Test Method Std. No. 141 or as in this specification. The panels used shall be prepared as in 4.3.1.1 unless otherwise specified.

TABLE VI. Index

Tests	Test method		Paragraph of this specification giving requirements
	Applicable method in Fed. Std. 141	Paragraph of this specification giving further reference	
Isolation of vehicle (supercentrifuge)	4032	--	--
Nitrocellulose	5205	--	3.2.1
Phthalic anhydride	7024	--	3.2.2
Rosin	5031	--	3.2.2
Phenol	5141	--	3.2.2

TABLE VI. Index (Cont'd.)

Tests	Test method		Paragraph of this specification giving requirements
	Applicable method in Fed. Std. 141	Paragraph of this specification giving further reference	
Plasticizers	7371	--	3.2.3
Pigment content	4022	--	3.2.4
Extender pigment, total	5271	--	3.2.4
Extender pigment analysis	7281	--	3.2.4
Solvents	7360	--	3.2.5
Condition in container	3011	--	3.3.1
Accelerated storage stability	--	4.3.3	3.3.2
Lacquer as packaged	--	4.3.3.1	3.3.2.1
Reduced lacquer	--	4.3.3.2	3.3.2.2
Odor	4401	--	3.3.3
Color	4250	4.3.4	3.3.4
Working properties	--	4.3.5	3.3.5
Dilution stability	4203	4.3.6	3.3.6
Self lifting properties	--	4.3.7	3.3.7
Drying time	4061	--	3.3.8
Surface appearance	--	4.3.8	3.3.9
Print resistance	6211	4.3.9	3.3.10
Primer absorption and lacquer resistance	6304	4.3.10	3.3.11
Coating anchorage	6304	4.3.11	3.3.12
Baking properties	--	4.3.12	3.3.13
Flexibility	6221	4.3.13	3.3.14
Flexibility (cold cracking)	6223	4.3.14	3.3.15
Polishing test	--	4.3.15	3.3.16
Toxicity	--	--	3.3.17
Fineness of grind	4411	4.3.16	Table III
Coarse particles and skins	4092	--	Table III
Viscosity	4282	4.3.17	Table III
Weight per gallon	4184	--	Table III
Specular gloss, 60°	6101	--	Table III
Directional reflectance	6121	--	Table III
Hiding power (contrast ratio)	4122	4.3.18	Table III
Infrared reflectance	6241	4.3.19	Table III
Blush resistance	6223	4.3.20	3.5.1
Water resistance	6011	4.3.21	3.5.2
Hydrocarbon resistance	6011	4.3.22	3.5.3
Weather resistance	6161	4.3.23	3.5.4
Anchorage (tape test)	6301	4.3.24	3.5.5
Workmanship	--	--	3.6

4.3.3 Accelerated storage stability.

4.3.3.1 Lacquer as packaged. Store a sample of lacquer, as packaged, according to method 3022 of Fed. Test Method Std. No. 141 for 7 days at 60° C. Observe for compliance with 3.3.2.1.

4.3.3.2 Reduced lacquer. Reduce the aged lacquer (4.3.3.1) as in 4.3.1.1. Then flow the thinned primer over a clear plate glass and examine in both the wet and dry (after 30 minutes) conditions. Examine by viewing through transmitted light. Check for compliance with 3.3.2.2.

4.3.4 Color. Determine color in accordance with method 4250 of Fed. Test Method Std. No. 141. Compare the specified color with the color of a panel prepared as in 4.3.1.1 for compliance with 3.3.4.

4.3.5 Working properties. Using the lacquer under test, a panel prepared in accordance with 4.3.1.1 shall be placed in a nearly vertical position and allowed to air-dry for 24 hours prior to examination. A second panel shall be prepared simultaneously, and in a similar manner, using the control lacquer. After air-drying for the specified time, the panels shall be compared as specified in 3.3.5, and the lacquer under test examined for the defects described in that paragraph.

4.3.6 Dilution stability. Reduce one volume of lacquer with two volumes of the test thinner (see 4.3.6.1), stir thoroughly, and place in a closed container. Observe the mixture for evidence of curdling, precipitation or separation immediately after mixing, and after storage for 24 hours. Check for compliance with 3.3.6.

4.3.6.1 Test thinner. The test thinner shall be composed of the following ingredients, in the amounts specified.

Ingredients	Percent by weight
Normal butyl acetate (TT-B-838)	15
Normal butyl alcohol (TT-B-846)	15
Toluene (TT-T-548)	70

4.3.7 Self lifting properties. Prime seven panels in accordance with 4.3.1.1 and air dry 18 hours. Apply the first coat of lacquer under test to the panels and allow to dry for ½, 1, 2, 4, 7, 24, and 48 hours. At the end of each drying period apply the second coat of lacquer and examine for compliance with 3.3.7.

4.3.8 Surface appearance. Examine the film of a panel prepared as in 4.3.1.1 under a magnification of 10 to 15 diameters for compliance with 3.3.9.

4.3.9 Print resistance. Prepare a panel as in 4.3.1.1 and air-dry for 3 hours. Test in accordance with method 6211 of Fed. Test Method Std. No. 141, wherein a 1-psi pressure shall be applied for 1 hour. Examine the panel 4 hours after removal of pressure for compliance with 3.3.10.

4.3.10 Primer absorption, lacquer resistance. Prepare panels coated with the lacquer under test and the control lacquer as in 4.3.1.1 except use only one lacquer coat of 0.8 to 1.2 mils dry film thickness. Apply the lacquer after the primer coats have dried 30 minutes, 1, 2, 6, and 24 hours. Test in accordance with method 6304 of Fed. Test Method Std. No. 141 and observe for compliance with 3.3.11.

4.3.11 Coating anchorage. Prepare panels coated with the lacquer under test and the control lacquer as in 4.3.1.1 and air-dry for 48 hours. Then test in accordance with method 6304 of Fed. Test Method Std. No. 141 for compliance with 3.3.12.

4.3.12 Baking properties. Prepare panels coated with the lacquer under test and the control lacquer as in 4.3.1.1 except that the panels shall be baked for 48 hours at a temperature of 63° to 68° C. (145° to 154° F.). The panels shall then be examined for compliance with 3.3.13.

4.3.13 Flexibility. Determine flexibility in accordance with method 6221 of Fed. Test Method Std. No. 141 on panels prepared as in 4.3.1.1 except bake at 100°–105° C. (212° to 221° F.) for 96 hours. Condition the panel for ½ hour under referee conditions and bend over a ¼ inch rod at a 2 second bending rate. Examine the coating for cracks over the area of the bend for compliance with 3.3.14.

4.3.14 Flexibility (cold cracking). Prepare panels as in 4.3.13 except bake for 48 hours instead of 96 hours. Then determine flexibility in accordance with method 6223 of Fed. Test Method Std. No. 141 using a ¼ inch mandrel and a 2 second bend rate. Check for compliance with 3.5.15.

4.3.15 Polishing test. Prepare a panel as in 4.3.1.1 and air-dry for 48 hours. Then polish using thirty brisk strokes with a normal force of approximately 2 pounds per inch square by rubbing lengthwise with a pad of unbleached cotton cloth with a thread count of approximately 115 by 55 and a weight of approximately 6 ounces per square yard. The gloss shall be determined before and after polishing and checked for compliance with 3.3.16.

4.3.16 Fineness of grind. The lacquer shall be reduced by one part of ethylene glycol monobutyl ether conforming to TT-E-776 to ten parts of lacquer, and then tested in accordance with method 4411 of Fed. Test Method Std. No. 141, for compliance with table III.

4.3.17 Viscosity. Reduce by volume one part of packaged lacquer with 1¼ parts of lacquer thinner conforming to table IV and test as in method 4282 of Fed. Test Method Std. No. 141. Check for compliance with table III.

4.3.18 Hiding power (contrast ratio). Determine the contrast ratio in accordance with method 4122 of Fed. Test Method Std. No. 141. Use a film applicator that will deposit a 3 inch wide film with a dry film thickness of 1 mil. maximum. Determine the reflectance and verify the film thickness in the area in which the reflectance was measured. Check for compliance with table III.

4.3.19 Infrared reflectance. Determine infrared reflectance in accordance with method 6241 of Fed Test Method Std. No. 141 on a panel prepared as in 4.3.1.1 and check for compliance with table III.

4.3.20 Blush resistance. Determine blush resistance in accordance with method 6223 of Fed. Test Method Std. No. 141 on panels of the lacquer under test and the control lacquer prepared as in 4.3.1.1. Compare the panels for conformance to 3.5.1.

4.3.21 Water resistance. Prepare two panels, one coated with the lacquer under test and the other with the control lacquer as in 4.3.1.1 and immerse in distilled water, at a temperature of 23° ± 1.1° C. (73.5° ± 2° F.), for 24 hours. Five minutes after removal from the water, examine lacquer film for compliance with 3.5.2.

4.3.22 Hydrocarbon resistance. Prepare two panels, one coated with the lacquer under test and the other with the control lacquer as in 4.3.1.1. Force-dry the two systems for 16 hours at 65° to 71° C. (150° to 160° F.). Then immerse in fluid conforming to TT-S-735, type III, at a temperature of 23° ± 1.1° C. (73.5° ± 2° F.), for 4 hours. Immediately after removal from the test fluid, compare the panels for conformance to 3.5.3.

4.3.23 Weather resistance. Prepare four panels as in 4.3.1.1 except that two panels shall be coated with the lacquer under test, and the remaining two panels with the control lacquer. Expose the panels in accordance with method 6161 of Fed. Test Method Std. No. 141 for 1 year in Florida and examine for conformance with 3.5.4.

4.3.24 Anchorage (tape test). Prepare four panels as in 4.3.1.1 except that two of the panels shall be coated with two coats of the lacquer under test, and the remaining two panels with two coats of the control lacquer. Test in accordance with method 6301 of Fed. Test Method Std. No. 141. Strip the tape from the panel immediately after application of the tape and check for compliance with 3.5.5.

4.4 Rejection criteria. If any of the test specimens fail to meet any of the tests required by this specification, the lot represented by the sample shall be rejected.

4.5 Inspection of preparation for delivery. The packaging, packing and marking of the lacquer shall be inspected to determine conformance to the requirements of section 5 of this specification.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing and marking. The lacquer shall be packaged, packed and marked in accordance with TT-P-143. The level of packaging shall be A, B, or C and the level of packing shall be A, B, or C, as specified (see 6.2). The lacquer shall be furnished in 1-quart of 1-gallon multiple friction top containers, in 5-gallon lug cover steel pails or in 55-gallon steel drums, as specified (see 6.2).

5.2 Additional markings. In addition to the markings required by TT-P-143 individual containers shall have the following markings:

> "THINNING DIRECTIONS: For spraying or brushing, reduce as required with thinner conforming to TT-T-266. Thinning with an approximately equal quantity of thinner will generally be satisfactory. To alleviate blushing under conditions of high humidity, up to 1 pint of thinner conforming to TT-E-776 may be added to 1 gallon of thinner conforming to TT-T-266."

Individual containers of olive drab No. X34087 and medium green (Navy) No. 34092 shall also be marked as follows:

> "WARNING. Avoid contamination of this infrared-reflecting color with other paints. To preserve infrared-reflectance, use only absolutely clean mixing paddles, containers, and other equipment for thinning or application."

6. NOTES

6.1 Intended use. The camouflage lacquer conforming to this specification is intended for use on metal surfaces as a camouflage color finish. Best performance will be obtained when the lacquer is applied over a metal surface properly pretreated and primed with a lacquer resisting primer. The lacquer should not be used over bare metal. The following finishing systems are recommended prior to the application of the camouflage lacquer.

6.1.1. Aluminum surfaces. Pretreatment of chromate chemical film per MIL-C-5541 or pretreatment coating per MIL-C-8514 or MIL-P-15328, plus a primer coating per TT-P-666, MIL-P-8585 or MIL-P-7962.

6.1.2 Steel surfaces. Pretreatment of zinc phosphate per TT-C-490, type I or pretreatment coating per MIL-C-8514 or MIL-P-15328, plus a primer coating per TT-P-664 or MIL-P-11414.

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. Color and color number (see 1.2).
c. Size of container (see section 5.).
d. Level of packaging and level of packing (see section 5.)
e. The lacquer shall be purchased by volume, the unit being a U.S. liquid gallon of 231 cubic inches at 68° F. (20° C.).

6.3 Supersession data. This specification includes the requirements of MIL-L-6805C dated 14 May 1959 and MIL-L-73A dated 4 June 1956.

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