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MIL-PRF-85285F
16 May 2022
SUPERSEDING
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PERFORMANCE SPECIFICATION

TOPCOAT, AIRCRAFT AND SUPPORT EQUIPMENT

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for aerospace topcoats with a maximum volatile organic compound (VOC) and maximum volatile organic hazardous air pollutants (VOHAPs). The topcoat is furnished in kit form with one, two, or three components.

1.2 Classification. The topcoats covered by this specification are divided into the following types, classes, forms and grades (see 6.2):

1.2.1 Types. The types of topcoats are as follows:

Type I - Aircraft application (420 grams/liter [g/l] maximum VOC content)

Type II - Support equipment application (340 g/l maximum VOC content)

Type III - Aircraft and support equipment application (50 g/1 maximum VOC content)

Type IV- Aircraft application with extended weatherability (420 g/l maximum VOC content)

Comments, suggestions, or questions on this document should be addressed to Commanding Officer, Naval Air Warfare Center Aircraft Division Lakehurst, System Standardization and PHS&T Branch, Code BL32600, Mail Stop 120-3, Route 547, Joint Base MDL, NJ 08733-5100 or emailed to LKE-NAVAIRDocComments@navy.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST online database at https://assist.dla.mil.

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1.2.2 Classes. The classes of topcoats are as follows:

Class H - High-solids formulation containing isocyanates
Class NH - High-solids formulation not containing isocyanates
Class W - Water-borne formulation containing isocyanates
Class NW - Water-borne formulation not containing isocyanates

1.2.3 Forms. The forms of topcoats are as follows:

Form S - Single-component topcoat
Form M - Multi-component (2 or 3 parts) topcoat

1.2.4 Grades. The grades of coatings are as follows:

Grade N - Not phosphate ester hydraulic fluid resistant
Grade P - Phosphate ester hydraulic fluid resistant

1.3 Part or Identifying Number (PIN). The PINs to be used for aerospace topcoats acquired to this specification are created as follows:

M85285	-	X	-	X	-	X	-	X	-	XXXXX	-	XXXX
Spec Code		Type Code 1 - Type I 2 - Type II 3 - Type III 4 - Type IV		Class Code H or NH or W or NW		Form Code S or M		Grade Code N or P		SAE AMS-STD-595 Color Code (see 6.7)		Kit Size Code (see 1.3.1)

Example: M85285-1-H-M-N-11136-004P is a type I, class H, form M, grade N, gloss red topcoat, provided as a 4-pint kit (see 1.3.1).

1.3.1 Kit size. The topcoats covered by this specification are purchased by volume, the unit being a kit containing one, two or three components. The kit component sizes need not be of the same size. When this part numbering system is used, the kit size is to be identified as:

Kit size 1/, 2/	Kit size designator
Less than one pint	3/
4-pint (0.47-liter)	004P
4-quart (0.95-liter)	004Q
4-gallon (3.79-liter)	004G
20-gallon (75.7-liter)	020G

1/ The kit size and its designator may be modified for ease of procurement and is not limited.

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2/ Classes W and NW require the addition of water that is not included in the topcoat kit to attain the volumetric purchase kit size.
3/ Designators for less than pint size kits (small touch-up kits) are expressed in cubic centimeters (cc) and are designated by "C."
Example: A type I, class H, form S, grade N, 50 cc kit, gloss red is designated as M85285-1-H-S-N-11136-050C.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL SPECIFICATION

TT-R-2918	-	Remover, Paint, No Hazardous Air Pollutants (HAPs).

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-5541	-	Chemical Conversion Coatings on Aluminum and Aluminum Alloys.
MIL-DTL-5624	-	Turbine Fuel, Aviation, Grades JP-4 and JP-5.
MIL-PRF-8625	-	Anodic Coatings for Aluminum and Aluminum Alloys.
MIL-PRF-23377	-	Primer Coatings: Epoxy, High-Solids.
MIL-PRF-23699	-	Lubricating oil, Aircraft Turbine Engine, Synthetic Base, NATO Code Numbers O-152, O-154, O-156, O-167
MIL-R-81294	-	Remover, Paint, Epoxy, Polysulfide, and Polyurethane Systems
MIL-DTL-81772	-	Thinner, Aircraft Coating.
MIL-PRF-83282	-	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537.
MIL-PRF-85570	-	Cleaning Compound, Aircraft, Exterior.
MIL-PRF-85582	-	Primer Coatings: Epoxy, Waterborne.

(Copies of these documents are available online at https://quicksearch.dla.mil/.)

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2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA Method 311 - HAPS in Paints & Coatings.

(Copies of this document are available online at http://www.epa.gov/ttn/emc/.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) INTERNATIONAL

ASTM D522/ D522M	-	Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
ASTM D523	-	Standard Test Method for Specular Gloss.
ASTM D823	-	Standard Practices for Producing Films of Uniform Thickness of Paint, Coatings, and Related Products on Test Panels.
ASTM D1193	-	Standard Specification for Reagent Water.
ASTM D1200	-	Standard Test Method for Viscosity by Ford Viscosity Cup.
ASTM D1210	-	Standard Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage.
ASTM D1640/ D1640M	-	Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings
ASTM D2243	-	Standard Test Method for Freeze-Thaw Resistance of Water-Borne Coatings.
ASTM D2244	-	Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
ASTM D2247	-	Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity.
ASTM D3335	-	Standard Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy.
ASTM D3359	-	Standard Test Methods for Rating Adhesion by Tape Test
ASTM D3363	-	Standard Test Method for Film Hardness by Pencil Test
ASTM D3924	-	Standard Specification for Standard Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials.

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ASTM D3960	-	Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
ASTM D5402	-	Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs
ASTM D5895	-	Standard Test Methods for Evaluating Drying and Curing During Film Formation of Organic Coatings Using Mechanical Recorders
ASTM D6905	-	Standard Practice for Impact Flexibility of Organic Coatings
ASTM D7091	-	Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nondestructive Coatings Applied to Non-Ferrous Metals
ASTM G155	-	Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

(Copies of these documents are available from www.astm.org.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ANSI/ASQ Z1.4	-	Sampling Procedures And Tables For Inspection By Attributes

(Copies of this document are available from www.asq.org.)

SAE INTERNATIONAL

SAE AMS3721	-	Tape for Organic Coatings Adhesion Testing
SAE AMS4035	-	Aluminum Alloy, Sheet and Plate 4.4Cu -1.5Mg-0.60Mn 2024-0 Annealed
SAE AMS4037	-	Aluminum Alloy, Sheet and Plate 4.4Cu -1.5Mg-0.60Mn 2024-T3 Solution Heat Treated
SAE AMS-STD-595	-	Colors Used in Government Procurement
SAE AS1241	-	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft

(Copies of this document are available from http://www.sae.org.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 Qualification. The topcoats furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list (QPL) in the qualified products database (QPD) at the time of contract award (see 4.3 and 6.5).

3.2 Materials. Materials used to manufacture these topcoats are not limited, provided that the resulting topcoats meet the requirements of this specification.

3.3 Toxicity. The topcoats shall have no adverse effect on the health of personnel when used for its intended purpose and with the precautions listed in 3.10.1 through 3.10.3, when evaluated in accordance with 4.6.15 (see 6.3). Components of the topcoats shall not contain cadmium, cadmium compounds, nor more than 0.05 percent by weight of lead metal or lead compounds. The topcoats shall not contain hexavalent chromium. Components of class NH or NW topcoats shall not contain isocyanates.

3.4 Composition. The topcoat furnished under this specification shall be in a single-component (form S) or a multi-component (form M) kit. Form S consists of a single component, containing all the resins, solvents, pigments and additives. Form M consists of component A containing pigmented resins and solvents, component B, containing unpigmented aliphatic resins and solvents, and optional component C containing organic solvents (or ingredients deemed incompatible/reactive with component A or B, for class H or NH). Products packaged as form M, component B or C (if applicable) shall act as the hardener or curing agent for component A. The topcoat kit components, when mixed or admixed (see 6.11), shall equal the volume as specified by the manufacturer and shall result in a product meeting the requirements specified in this specification.

Classes W and NW may require additions of water (not included in the topcoat kits). Water is considered a component of the kit when calculating manufacturer specified volume. Topcoat components consist of the minimum volume specified by the procuring activity (see 6.2). Note that in the case of a single component topcoat, mixed/admixed is defined as the coating being thoroughly incorporated for a maximum of five minutes vigorous hand stirring. In the case of a multi-component coating, admixed is defined as all components being added in the manufacturer's specified sequence and ratios, then thoroughly incorporated for five minutes.

3.4.1 Solvent content. All solvents necessary for thinning purposes shall be supplied as part of the coating kit, with the exception of class W and NW. The resistivity of the solvents shall permit application of class H and NH topcoats by electrostatic spray methods. The maximum VOC content shall be 420 grams per liter (g/l) for types I and IV topcoats, 340 g/l for type II coatings, and 50 g/l for type III topcoats. Solvents used for class H and NH shall be urethane grade and contain a minimum of water and alcohol (see 6.4). Class H and NH topcoats shall be compatible with thinner conforming to MIL-DTL-81772, type I and IV. Brominated and chlorinated solvents, except for para-chlorotrifluoromethylbenzene or equal, shall be prohibited in the formulation of this product.

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3.4.2 Volatile organic hazardous air pollutants (VOHAPs). The VOHAP content shall not exceed the limits for the individual finishes listed in table I.

TABLE I. VOHAP limits.

Type	Class	Color/Finish	VOHAP Limit (lb/gal)	VOHAP Limit (g/l)
I	H	17925, Gloss/Semi-Gloss	0.20	24
I	H	36375, Camouflage	0.27	32
II	H	17925, Gloss/Semi-Gloss	1.33	159
II	H	36375, Camouflage	1.19	142
III	W	17925, Gloss/Semi-Gloss	0.03	3
III	W	36375, Camouflage	0.1	10
IV	H	17925, Gloss/Semi-Gloss	1.30	156
IV	H	36375, Camouflage	0.80	95
I	NH	17925, Gloss/Semi-Gloss	0.0	0.0
I	NH	36375, Camouflage	0.0	0.0
II	NH	17925, Gloss/Semi-Gloss	0.0	0.0
II	NH	36375, Camouflage	0.0	0.0
III	NW	17925, Gloss/Semi-Gloss	0.0	0.0
III	NW	36375, Camouflage	0.0	0.0
IV	NH	17925, Gloss/Semi-Gloss	0.0	0.0
IV	NH	36375, Camouflage	0.0	0.0

3.5 Component properties.

3.5.1 Condition in container.

3.5.1.1 Component A. When tested in accordance with 4.6.1, component A (or single component topcoats) shall be smooth, homogeneous, and pourable. The topcoat shall be free of grit, skin, seeds, lumps, foreign contaminants, and abnormal thickening or livering, and shall not exhibit pigment flotation nor excessive settling that cannot be reincorporated into a smooth, homogeneous state by mixing with a hand paddle. Component A shall not cause its container to deform (see 4.6.1). A deformed or otherwise compromised container will be rejected for testing.

3.5.1.2 Component B (if applicable). Component B shall be homogeneous, clear, and free from gelation or detectable particulate matter, either suspended in solution or settled on the inner surface of the container. Component B shall not cause its container to deform (see 4.6.1). A deformed or otherwise compromised container will be rejected for testing.

3.5.1.3 Component C, Class H and NH (if applicable). Component C shall be clear and contain predominately organic solvents. Component C shall not cause its container to deform (see 4.6.1). A deformed or otherwise compromised container will be rejected for testing.

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3.5.2 Storage stability. The unopened topcoat components, as packaged by the manufacturer, shall meet all requirements of this specification after storage for a period of one year for kits in plastic and metal containers greater than 120 ml (4 ounces) (see 4.5 and 6.5.2). Kits in plastic containers less than 120 ml (4 ounces) shall meet all the requirements of this specification for 6 months (see 4.6 and 6.5.2). The conditions for the storage shall be a daily ambient air temperature that is maintained at 1.7 to 46 ºC (35 to 115 ºF).

3.5.3 Accelerated storage stability. The topcoat components, after storage for 14 days (see 4.6.2) as packaged by the manufacturer, when mixed/admixed shall meet all requirements of this specification. The containers shall not become deformed or the lid shall not become unsealed during the storage period. A deformed or otherwise compromised container will be rejected for testing.

3.5.4 Freeze-thaw stability (class W and NW only). The topcoat components, as packaged by the manufacturer, shall meet all the requirements of this specification after being subjected to five cycles of freezing and thawing as specified in 4.6. A deformed or otherwise compromised container will be rejected for testing.

3.6 Liquid properties.

3.6.1 Fineness of grind. The fineness of grind (measured on the Hegman scale) of the mixed/admixed topcoat shall be a minimum of 7 for gloss colors and a minimum of 5 for camouflage (flat or lusterless) and semi-gloss colors, when tested as specified in 4.6.

3.6.2 Viscosity and pot life. The viscosity of the mixed/admixed topcoat when maintained under continuous mixing (no vortex) in a closed container, and tested as specified in 4.6 through a No. 4 Ford cup, shall be as specified in table II.

TABLE II. Viscosity.

Time from mix (minimum)	Maximum time through a No. 4 Ford cup
Initially	30 seconds
4 hours	60 seconds
5 hours	no gelation

3.7 Cured topcoat properties.

3.7.1 Drying time. When applied by spray techniques and tested as specified in 4.6, the topcoat shall be set-to-touch within six hours and dry-hard within twelve hours.

3.7.2 Surface appearance. The coating shall dry to a uniform, smooth surface, free from runs, sags, bubbles, streaks, hazing, seeding, dusting, floating, mottling, or other defects (see 4.6.3). The coating shall be compared to the Ford Orange Peel Standards (ACT Test Panels LLC, Hillsdale, MI) and ratings of 1 through 4 are unacceptable.

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3.7.3 Color. The applied topcoat, prepared in accordance to 4.5 through 4.5.2 shall be tested in accordance with ASTM D2244 using CIELAB color coordinates with a 10° observer and D65 illuminant. The applied topcoat dry film shall have a color difference (ΔE) of less than 1 when compared to the specified color chip in SAE AMS-STD-595.

3.7.4 Gloss. The specular gloss of the topcoat, when tested as specified in 4.6, shall be as shown in table III at a 60° angle of incidence.

TABLE III. Specular gloss.

Color type	Minimum	Maximum
Gloss	90	---
Semi-gloss	15	45
Camouflage (flat or lusterless)	---	5

A maximum of 10 for camouflage colors at an 85° angle of incidence.

3.7.5 Opacity (hiding power). The topcoat shall have a contrast ratio of no less than 0.95 for all colors except yellow (SAE AMS-STD-595, Color 13538), which shall have a contrast ratio of not less than 0.90, when cast to a dry film thickness of 1.9 to 2.1 mils [48 to 53 micrometer (μm)] on a black and white chart and tested in accordance with 4.6.4.

3.7.6 Adhesion. The topcoat shall have a rating of no less than 4A when examined in accordance with ASTM D3359 (see 4.6.5).

3.7.7 Flexibility.

3.7.7.1 Impact flexibility. The topcoat shall meet the following minimum requirements for ambient temperature impact flexibility: types I, III and IV, 40 percent; and type II, 5 percent; when tested in accordance with 4.6.6.1.

3.7.7.2 Low-temperature flexibility (Type I, Type III and Type IV only). The type I, type III, and type IV topcoats, at a temperature of -51 ±3 °C (-60 ±5 °F), shall exhibit no cracking when bent, coated side away, over a 1.0 inch (in.) [25.4 millimeter (mm)] mandrel for gloss and semi-gloss colors, and over a 2.0 in. (50.8 mm) mandrel for camouflage colors, when tested in accordance with 4.6.6.2.

3.8 Resistance properties.

3.8.1 Fluid resistance. When immersed in lubricating oil conforming to MIL-PRF-23699, hydraulic fluid conforming to MIL-PRF-83282, and JP-5 fuel conforming to MIL-DTL-5624, the exposed topcoat shall not soften more than 2 pencil gouge hardness units from an unexposed sample, shall have a minimum hardness of B, and shall not exhibit any blistering, softening, or other topcoat defects. Slight staining of the topcoat is acceptable (see 4.6.7).

3.8.2 Weather resistance. For types I, II, and III, after exposure in Xenon-arc weatherometer for 500 hours as specified in 4.6.8: (a) 60° specular gloss of the topcoat shall be a minimum of 80 Gloss Units (G.U.) for gloss colors; a minimum of 15 G.U. for semi-gloss colors; a maximum of

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5 G.U. for camouflage colors, and (b) the topcoat color difference (ΔE) shall have a value of less than 1.0 when compared to an unexposed sample of the same batch using CIELAB color coordinates.

For type IV, after exposure in Xenon-arc weatherometer for 3000 hours as specified in 4.6.8: (a) The 60° specular gloss of gloss colors shall have a change in Gloss Units (G.U.) of less than 20 from the unexposed initial value. (b) The semi-gloss colors shall have a minimum of 15 G.U. at 60°. (c) The camouflage colors shall have a change in G.U. of less than 3 at 60° and 85° from the unexposed initial values, and (d) the topcoat color difference (ΔE) shall have a value of less than 1.0 when compared to an unexposed sample of the same batch using CIELAB color coordinates.

3.8.3 Humidity resistance. The topcoat shall withstand exposure for no less than 30 days in a humidity cabinet maintained at 49 ±2 °C (120 ±3 °F) and 100 percent relative humidity (RH) without blistering, softening, exhibiting any loss of adhesion, nor other film defects when tested as specified in 4.6.

3.8.4 Heat resistance (color change). The topcoat after exposure shall have a color difference (ΔE) less than or equal to 1.0 when compared to an unexposed sample of the same batch and tested as specified in 4.6.9 using CIELAB color coordinates.

3.8.5 Solvent resistance (cure). The topcoat shall withstand 25 double rubs with a cotton terrycloth rag soaked in methyl ethyl ketone (MEK) solvent (see 6.10), when tested in accordance with 4.6.10. Rubbing through to bare metal indicates failure of the topcoat due to improper cure.

3.8.6 Tape resistance. The topcoat shall not exhibit permanent marring caused by masking tape applied to the coated test panels, when tested in accordance with 4.6.11.

3.8.7 Phosphate Ester Hydraulic Fluid Resistance (Grade P only). After 30 days of immersion the immersed portion of the panel shall be tested immediately to ASTM D3363 (see 4.6.12). The coating shall have a minimum pencil gouge hardness of HB.

3.9 Working properties.

3.9.1 Mixing. The components of the topcoat, including thinner and water if applicable (see 3.5.1.3), shall homogeneously blend when hand mixed for no more than 5 minutes in the volume mixing ratio specified by the manufacturer. Within one hour of mixing, the mixed/admixed topcoat shall not separate into visually distinct layers or exhibit foaming that persists one hour or more after mixing.

3.9.2 Application. The topcoat shall be applied by conventional, airless, HVLP (High Volume Low Pressure), or electrostatic (class H and NH only) spray application. When spray is applied at 15.6 to 32.2 °C (60 to 90 °F) and a relative humidity of 20 to 80 percent, the topcoat material shall yield a smooth, uniform film at a dry-film thickness of 1.7 to 2.3 mil when measured in accordance with ASTM D7091. When reducing the topcoat, caution shall be taken

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not to exceed the maximum VOC content of 420 g/l for types I and IV, 340 g/l for type II, and 50 g/l for type III.

3.9.3 Cleanability. The topcoat shall maintain a cleaning efficiency of not less than 75 percent for semi-gloss and camouflage colors and 90 percent for gloss colors, when cleaned in accordance with 4.6.13 through 4.6.13.5.

3.9.4 Strippability. Topcoats shall be tested in accordance with Methods A and B of 4.6.14, and a minimum of 90 percent of the topcoat shall be stripped by one of the methods.

3.10 Identification of material. Individual containers greater than 1 pint and cases of containers 1 pint or less, shall bear permanent labels showing the information contained herein. Approved modified topcoats shall be clearly identified on the label (see 6.5.3.1).

Specification MIL-PRF-85285F, "Topcoat, Aircraft and Support Equipment"
Component A, B, or C (as applicable)
Type, class, form and grade
Color (name and SAE AMS-STD-595 color number)
Manufacturer's name, product number, and batch number
Date of manufacture by month and year
Expiration date
VOC content in grams/liter
VOHAP content in grams/liter
Net contents
Mixing and thinning instructions
Mix ratio (volumetric)

3.10.1 Component containers. All containers of toxic and hazardous chemicals and materials shall be labeled in accordance with the applicable federal, state, and municipal laws, statutes, regulations, and ordinances. In addition to the labeling, the following shall appear on each component container in every kit, on each exterior shipping container, and on the case of containers less than 1 pint.

CAUTION
THIS TOPCOAT MATERIAL IS TOXIC AND FLAMMABLE (if applicable)
DO NOT USE IN CONFINED AREAS
DO NOT USE WHERE THERE ARE OPEN FLAMES, ARCING EQUIPMENT,
HOT SURFACES, NOR WHERE SMOKING IS PERMITTED.
USE ONLY WITH ADEQUATE VENTILATION.
AVOID BREATHING OF VAPOR.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER. FOR EYES, GET MEDICAL ATTENTION.

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3.10.2 Lid (component B only, if applicable). Each lid of component B material shall have a red printed label with the following information:

USE CAUTION.
OPEN SLOWLY.

3.10.3 Precautions. Each kit shall include a sheet listing the following precautions:

a. The surface to be coated shall be clean (free of oil, dust, etc.)
b. Spray equipment shall be adequately grounded. Clean equipment immediately after use. For class W and NW only, use water followed by thinner. For all other classes use thinner only. In all cases thinner conforming to MIL-DTL-81772, type I or IV, shall be used. For class H and NH only, do not thin unless specifically allowed by manufacturer. If thinning is permitted by manufacturer, use manufacturer recommended thinners.
c. Mix only the amount of topcoat to be used within four hours.
d. Never mix topcoat or individual component from one vendor with that of another vendor. Components from different kits are not interchangeable. For example, do not use Component A in white with component B in gray.
e. Apply to pretreated metal or appropriately prepared organic matrix composite surfaces.
f. Dispose of, without opening, any container that is bulged, deformed, or otherwise compromised.
g. Other warnings and precautions as applicable.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.3).
b. Conformance inspection (see 4.4).

4.2 Inspection conditions. Unless otherwise specified, qualification inspections shall be performed in accordance with the conditions specified in ASTM D3924, and in triplicate. Unless otherwise stated in the test method or paragraph herein, room temperature shall be 21° ±5 °C (70° ±10 °F) and relative humidity as 50 ±10 percent.

4.3 Qualification inspections. Qualification inspections shall consist of all tests specified in 4.6.

4.4 Conformance inspections.

4.4.1 Tests. Conformance inspections shall be performed by the manufacturer on each production batch. Conformance inspection consists of all the tests specified in table IV (see 6.8).

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TABLE IV. Conformance inspections.

Requirement Paragraph	Test	Test Method Paragraph	ASTM Method
3.6.1	Fineness of grind	---	D1210
3.6.2	Viscosity and pot life	---	D1200
3.7.1	Drying time	---	D5895/D1640/D1640M
3.7.2	Surface appearance	4.6.3	---
3.7.3	Color	---	D2244
3.7.4	Gloss	---	D523
3.7.5	Opacity (hiding power)	4.6.4	D2244
3.7.6	Adhesion, tape test	4.6.5	D3359
3.7.7.1	Impact flexibility	4.6.6.1	D6905
3.7.7.2	Low-temperature flexibility (types I, III and IV)	4.6.6.2	D522/D522M

4.4.1.1 Visual inspection of filled containers. Samples shall be selected at random from each lot (see 6.8) in accordance with ANSI/ASQ Z1.4, inspection level S-2. The lot size for this examination shall be the number of kits fully prepared for delivery. The samples shall be examined for container fill, weight, and marking.

4.5 Test panels. All test panels shall be prepared under laboratory conditions (see 4.2). With the exception of the panels used for flexibility testing, all test panels shall be aluminum alloy 2024 (T3 temper) conforming to Table V, panel A. Panels to be used for flexibility testing shall be aluminum alloy 2024 (O temper) conforming to Table V, panel B.

4.5.1 Panel preparation. Test panels shall be prepared as specified in table V.

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TABLE V. Aluminum test panels.

Panel	Substrate	Common name	Panel dimensions	Pretreatment
A	SAE AMS4037 (T3 temper)	Al2024-T3 (T3 temper)	0.025 by 3.0 by 6.0 in. (0.625 by 76.2 by 152.4 mm)	MIL-DTL-5541, class 1A (conversion coating)
B	SAE AMS4035 (O temper)	Al2024-O (O temper)	0.020 by 3.0 by 6.0 in. (0.508 by 76.2 by 152.4 mm)	MIL-PRF-8625, type I or IC (anodize, unsealed)

4.5.2 Application of coatings.

4.5.2.1 Primer coating. Spray apply one cross-coat of primer coating to a dry-film thickness of 0.6 to 0.9 mil (15 to 23 µm) in accordance with ASTM D823, Method D that conforms to MIL-PRF-23377 or MIL-PRF-85582 and air dry for at least five hours or at least two hours, respectively.

4.5.2.2 Topcoat. In accordance with the manufacturer's instructions, the admixed topcoat may be reduced with water meeting the type IV requirements of ASTM D1193, for class W and NW, or thinner conforming to MIL-DTL-81772, type I and IV, for class H and NH. If reducing with thinner, do not exceed the maximum allowable VOC content (see 3.4.1). Allow the topcoat to stand no less than 30 minutes before using. Spray apply the topcoat in accordance with ASTM D823 Method D to a dry-film thickness of 1.7 to 2.3 mil (43 to 58 µm). Prior to testing, the applied coating shall be air-dried for no less than 14 days at room temperature. For conformance testing, the panels can be air-dried at room temperature for no less than 24 hours followed by 24 hours at 150 °F (see 4.6.6).

4.6 Test methods. Tests in this specifications shall be conducted in accordance with the methods specified in 4.6.1 through 4.6.14 (see table VI).

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TABLE VI. Test methods.

Requirement Paragraph	Test Title	Test Method Paragraph	EPA Method Number	ASTM Method
3.3	Toxicity	4.6.15	---	---
3.3	Lead and cadmium content	---	---	D3335
3.3	Isocyanate content			See 6.5.2
3.4.1	VOC content	---	---	D3960
3.4.2	VOHAP content	---	311	
3.5.1.1	Condition in container (component A)	4.6.1	---	---
3.5.1.2	Condition in container (component B) (if applicable)	4.6.1	---	---
3.5.1.3	Condition in container (component C) (if applicable)	4.6.1	---	---
3.5.2	Storage stability	4.6 – 4.6.13	---	---
3.5.3	Accelerated storage stability	4.6.2	---	---
3.5.4	Freeze-thaw stability (class IW and NW only)	---	---	1/ D2243
3.6.1	Fineness of grind	---	---	D1210
3.6.2	Viscosity and pot life	---	---	D1200
3.7.1	Drying time	---	---	D5895
3.7.2	Surface appearance	4.6.3	---	---
3.7.3	Color	---	---	D2244
3.7.4	Gloss	---	---	D523
3.7.5	Opacity (hiding power)	4.6.4	---	D2244
3.7.5, 3.9.2	Dry Film Thickness	4.5.2, 4.6.4		D7091
3.7.6	Adhesion, tape test	4.6.5	---	D3359
3.7.7.1	Impact flexibility	4.6.6.1	---	D6905
3.7.7.2	Low-temperature flexibility (types I, III and IV)	4.6.6.2	---	D522/ D522M
3.8.1	Fluid resistance	4.6.7	---	D3363
3.8.2	Weather resistance	4.6.8	---	G155
3.8.3	Humidity resistance 2/	---	---	D2247
3.8.4	Heat resistance (color change)	4.6.9		D2244
3.8.5	Solvent resistance (cure)	4.6.10	---	D5402
3.8.6	Tape resistance	4.6.11	---	---
3.8.7	Phosphate ester hydraulic fluid resistance	4.6.12	---	D3363

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TABLE VI. Test methods - Continued.

Requirement Paragraph	Test Title	Test Method Paragraph	EPA Method Number	ASTM Method
3.9.3	Cleanability	4.6.13	---	---
3.9.4	Strippability	4.6.14	---	---

1/ One freeze-thaw cycle shall be 16 hours at –9 ±3 °C (15 ±5 °F) followed by a minimum of 8 hours at a room temperature of 18 to 29.5 °C (65 to 85 °F).
2/ The topcoat tested shall be applied to test panels in accordance with 4.5 through 4.5.2.

4.6.1 Condition in container. Each component in its unopened container shall stand without agitation for no less than 14 days at room temperature (excluding storage stability test containers). After this period, the containers shall be examined for bulging or other deformation due to internal pressure. Each component container shall be opened and examined, then mixed by vigorously hand stirring with a paddle for not more than 5 minutes, then examined for conformance to 3.5.1. Examine the condition of component B for conformance to 3.5.1.2. Examine the condition of component C (if applicable) for conformance to 3.5.1.3.

4.6.2 Accelerated storage stability. Not less than one full, unopened, sealed container of each component shall be stored undisturbed for not less than 14 consecutive days in a location maintained at 60 ±3 °C (140 ±5 °F). At the end of 14 days, the container(s) shall be allowed to cool 24 hours to room temperature (see 4.2). During the storage period, it is advised that the unopened containers be placed in larger, vented containers to confine any splash that may occur if the lid of the unopened container is blown off by gassing. If, upon removal, the unopened container is deformed, do not open. If the container is not deformed, open carefully and examine its contents for conformance to 3.5.3.

4.6.3 Surface appearance. Within four hours after mixing, the coating shall be applied to test panels in accordance with 4.5 through 4.5.2 and air dried for no less than 24 hours. The panels shall then be examined for conformance to 3.7.2.

4.6.4 Opacity (hiding power). The mixed/admixed topcoat shall be cast to a dry film thickness of 1.9 to 2.1 mil [48 to 53 micrometer (μm)] on a black and white chart (Lenata Form 3B, or equivalent). The contrast ratio shall be determined by measuring the “L” reflectance value of topcoat over the black and white side of the chart, respectively. Determine the “L” value of the topcoat covering the white and black part of the chart, L_W and L_B respectively, in accordance with ASTM D2244. The contrast ratio is calculated as follows: $C = L_B \div L_W$.

4.6.5 Adhesion. The topcoat shall be applied to the test panels in accordance with 4.5 through 4.5.2. The test panels shall be immersed in distilled water for no less than 24 hours at room temperature (see 4.2). Remove the test panels from the water and wipe dry with a soft cloth. Within 3 minutes after removal from the water, wipe dry and make two parallel scribes

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with a stylus through the topcoat to the substrate. The scribes shall be ¾ of an inch apart and 2-inches long. The panels shall then be scribed to the substrate from opposing ends of the parallel scribes to form an "X" as shown on figure 1. Immediately apply a 1-inch wide strip of masking tape having an average adhesion of 60-ounces/inch widths (3M Company #250 or equivalent [SAE AMS3721]). The tape shelf life is typically one year from date of manufacture with the adhesive side down across the scribes. Press the tape against the surface of the topcoat by passing a 4½-pound rubber covered roller, approximately 3½ inches in diameter and 1¾ inches in width across the tape eight times. Remove the tape with one quick motion and examine for topcoat damage. Examine the topcoat for conformance to 3.7.6.

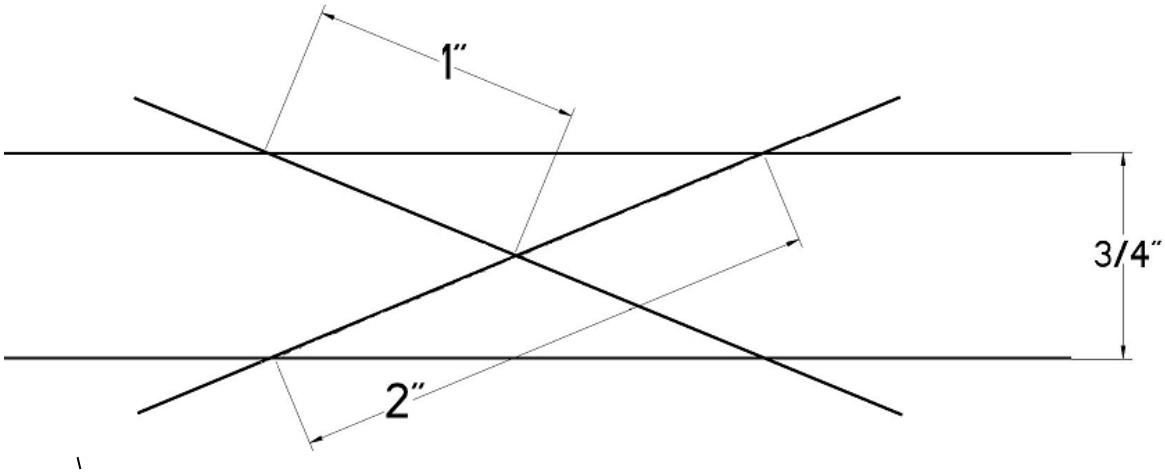


FIGURE 1, Design of X scribe.

4.6.6 Flexibility. Test panels shall be as specified in table V, panel B. Test panel dimensions shall be 0.025 by 3.0 by 6.0 in. (0.5 by 76.2 by 152.4 mm). Apply the topcoat, without a primer, in accordance with 4.5.2.2, and allow the test panels to air-dry for no less than 14 days before testing. For conformance testing, the panels can be air-dried for no less than 24 hours followed by 24 hours at 150 °F.

4.6.6.1 Impact flexibility. Test panels shall be prepared in accordance with table V, panel B. The flexibility of the topcoat shall then be tested in accordance with ASTM D6905, using a Gardco GE Universal Impact Tester, Model #172 (or equivalent as approved by the qualifying activity). Place the coated panel, film side downward, on the rubber pad at the bottom of the impacter guide. Drop the impacter on the panel through the impacter guide, ensuring that the impression of the entire rim of the impacter is made in the panel (recommended drop height of the impacter is 34 inches). Reverse the impacter ends and drop it through the guide on the panel adjacent to the first area of impact. Using 10 power magnification, examine for conformance to 3.7.7.1; record the percent elongation corresponding to the largest spherical impression at which no cracking occurs.

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4.6.6.2 Low-temperature flexibility (Type I, Type III and Type IV only). Test panels, prepared as specified in table V, panel B, shall be tested in accordance with ASTM D522, method B. The test shall be performed at a temperature of -51 ±3 °C (-60 ±5 °F) using a 1.0 in. mandrel for gloss and semi-gloss colors and a 2.0 in. mandrel for camouflage colors. After testing, examine the topcoat using the unaided eye, for conformance to 3.7.7.2.

4.6.7 Fluid resistance. The topcoat applied to test panels in accordance with 4.5 through 4.5.2 shall be immersed in the fluids within ½ to ¾ of the length of the test panel, at the temperature and for the minimum time specified in table VII. One panel shall act as a control, the others as test specimens The film shall be tested one hour after removal from the fluid and wiped clean for conformance to 3.8.1. Pencil hardness shall be tested in accordance with ASTM D3363. The hardest pencil that does not completely break through the topcoat shall be recorded as the hardness value.

TABLE VII. Immersion time.

Fluid	Fluid temperature	Time of immersion (minimum)
Lubricating oil (conforming to MIL-PRF-23699)	121 ±3 °C (250 ±5 °F)	24 hours
Hydraulic fluid (conforming to MIL-PRF-83282)	66 ±3 °C (150 ±5 °F)	24 hours
JP-5 fuel (conforming to MIL-DTL-5624)	Room temperature	7 days

4.6.8 Weather resistance. For types I, II, and III, the topcoat shall be applied to test panels in accordance with 4.5 through 4.5.2, and tested in accordance with ASTM G155 with a Xenon-arc weatherometer using a daylight filter (Atlas Material Testing Technology or equivalent as approved by the qualifying activity) that is cycling between 102 minutes of light only and 18 minutes of light and water spray for not less than 500 hours.

For type IV the topcoat shall be applied to test panels in accordance with 4.5 through 4.5.2, and tested in accordance with ASTM G155 with a Xenon-arc weatherometer using a daylight filter (Atlas Material Testing Technology Company or equivalent as approved by the qualifying activity) that is cycling between 102 minutes of light only and 18 minutes of light and water spray for not less than 3000 hours.

The following conditions shall apply when tested in accordance with ASTM G155:

Cabinet temperature:	42 ±3 °C (108 ±5 °F)
Black body temperature in cabinet:	63 ±3 °C (145 ±5 °F)
Relative humidity in cabinet:	50 ±5 percent
Intensity (spectral irradiance):	0.35 to 0.5 watt/meter^2 at a wavelength of 340 nm

After removal from the weatherometer the gloss units shall be tested in accordance with ASTM D523 to determine conformance to 3.8.2. The topcoat color differences shall then be tested in accordance with ASTM D2244 using CIELAB color coordinates with a 10° observer and D65 illuminant and examined for conformance to 3.8.2.

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4.6.9 Heat resistance. Prepare three test panels in accordance with 4.5 through 4.5.2. One test panel shall act as control, the other two as the test specimens. Expose the test specimens to 121 ±3 °C (250 ±5 °F) for 60 minutes. After exposure, allow the test panels to cool to room temperature. The topcoat shall then be tested in accordance with ASTM D2244 using CIELAB color coordinates with a 10° observer and D65 illuminant and examined for conformance to 3.8.4.

4.6.10 Solvent resistance (cure). Test panels shall be prepared in accordance with 4.5 through 4.5.2. A cotton, terrycloth rag shall be soaked in MEK solvent and rubbed back and forth 25 times (50 passes) over the topcoat with firm finger pressure in accordance with ASTM D5402 method A. The topcoat shall be examined for conformance to 3.8.5.

4.6.11 Tape resistance. Test panels, prepared as specified in 4.5 through 4.5.2, shall be air-dried for no less than twelve hours. A strip of masking tape (3M Company #250 or equivalent as approved by the qualifying activity), no less than 1.0 in. (25.4 mm) wide, shall be applied to each panel, adhesive side down, and pressed down with one pass of a roller weighing no less than 4.5 pounds (2.04 kilograms (kg)). The tape shall remain in contact with the test panels for no less than one hour and then shall be carefully removed. Examine the topcoat conformance to 3.8.6.

4.6.12 Phosphate ester hydraulic fluid resistance (Grade P only). The coating shall be applied to test panels in accordance with 4.5 through 4.5.2. Then ½ to ¾ of each panel shall be immersed for 30 days in fluid conforming to SAE AS1241, Type V, Grade B at 77 ±5 ºF (25 ±3 ºC). Remove panels and wipe dry with a lint-free wipe and examine for conformance to 3.8.7.

4.6.13 Cleanability. The cleanability test method shall be performed in accordance with 4.6.13.1 through 4.6.13.5 to determine conformance to 3.9.3.

4.6.13.1 Preparation of artificial soil. Place 50.0 ±0.5g of carbon black and 500.0 ±1.0g of hydraulic fluid conforming to MIL-PRF-83282, in a container, such as a one quart jar. Homogenize the soil using a high shear (such as a Cowles dispersator or equivalent) mixer for 15 ±1 minutes. Prior to application of the soil, stir or shake the mixture by hand.

4.6.13.2 Preparation of test panels. Prepare two test panels in accordance with 4.5 through 4.5.2. Using a clean, hog bristle brush, lightly scrub the topcoat of each panel with a 1.0 percent (by weight) solution of Alconox detergent, or equivalent, in reagent water. Rinse each panel thoroughly three times with reagent water. Dry for no less than18 hours at 49 ±2 °C (120 ±4 °F). Using ASTM D2244, determine the L value of the topcoat. This shall be value "A" (see 4.6.13.5).

4.6.13.3 Soiling of test panels. Using a soft-bristle brush, coat the painted surfaces of test panels with the prepared soil. Remove excess soil by covering the test panel surface with folded absorbent tissue and exerting pressure by rolling the tissue with a 5 lb. rubber roller. Repeat this blotting procedure twice. Brush the soiled surface parallel to the long dimension of the test panel, using 10 brush strokes in each direction. Bake the test panel at 105 ±2 °C (221 ±4 °F) for 60 ±1

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minutes. Determine the L value of the topcoat in accordance with ASTM D2244. This shall be value "B" (see 4.6.13.5).

4.6.13.4 Procedure. Within 4 hours of soiling the test panels, conduct the cleanability test as specified in MIL-PRF-85570, using the type II control formulation at a 14:1 water/cleaner ratio. Determine the L value of the topcoat in accordance with ASTM D2244. This shall be value “C” (see 4.6.13.5).

4.6.13.5 Calculation. Calculate the cleaning efficiency achieved on each test panel as follows (value "A" from 4.6.13.2, value "B" from 4.6.13.3, and value "C" from 4.6.13.4) and examine for conformance to 3.9.3:

Cleaning efficiency (%) = [(C - B) ÷ (A - B)] x 100

4.6.14 Strippability. Method A: Prepare two test panels as specified in 4.5 through 4.5.2 and weather for no less than 500 hours as specified in 4.6.8. Using a stylus, the panels shall be scribed to the substrate with an “X” 1-inch in length in the middle of the panel on the coated surface side. Seal the edges of the prepared test panels with beeswax by dipping in melted wax to a depth not to exceed 6 mm (0.25 in.) from all edges. The test panels shall then be placed on a rack at 60° to the horizontal, coated side up. Enough topcoat remover conforming to the control formulation of TT-R-2918, type I, shall be poured along the upper edge of the test panels to completely cover the topcoat surface. After 4 hours of exposure, the panel shall then be scraped with a rubber scraper to remove loosened topcoat; apply additional remover conforming to the control formulation of TT-R-2918, type I, to cover any remaining topcoat and allow it to dwell for an additional 4 hours. Immediately after this second 4 hour exposure, the test panels shall be scraped with a rubber scraper to remove the bulk of the loosened topcoats and remover residue. The test panels shall then be rinsed with cool tap water and brushed with a soft, nylon bristle brush. Paint removal shall be determined for each test panel by estimating the percentage of the substrate revealed by the stripping process. The result shall be the average of the two panels tested. The result shall conform to 3.9.4.

Method B: Test panels, prepared as specified in 4.5 through 4.5.2 and weathered for no less than 500 hours as directed in 4.6.8 shall be placed on a rack at a 60° angle with the horizontal. Seal the edges of the prepared test panels with beeswax by dipping in melted wax to a depth not to exceed 6 mm (0.25 in.) from all edges. Enough paint remover conforming to MIL-R-81294, type I or II, shall be poured along the upper edge of each test panel to completely cover the topcoat surface. After 60 minutes of exposure, the loosened topcoat shall be brushed off, and the test panels shall be rinsed while brushing under a stream of cool water. The result shall be the average of the two panels tested. The result shall conform to 3.9.4.

4.6.15 Toxicity. The product shall be evaluated by the Navy Environmental Health Center (NAVENVIRHLTHCEN) using the administrative Health Hazard Assessment (HHA) (see 6.3).

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. The combination of all properties of MIL-PRF-85285: component, liquid, cured topcoat, resistance, mixing, application, cleanability, strippability; along with the composition and solvent content provide the necessary requirements for a topcoat used in the extremes of the naval aviation environment. There are no commercial equivalents that meet the combination of all properties of MIL-PRF-85285. Type I of this topcoat is intended for use on aircraft weapons systems and other applications. Type II is intended for use on support equipment. Type III is intended for use on aircraft and support equipment. Type IV is intended for use on aircraft weapons systems where extended weatherability is necessary. Type IV is a direct replacement for Type I on aircraft weapons systems. No additives other than the appropriate thinner for class H and NH, nor deionized or distilled water for class W and NW to obtain the proper spray viscosity need to be added.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Type, class, form, and grade (see 1.2).
c. Quantity and size of containers.
d. Storage stability/shelf life (see 3.5.2).
e. If a retention sample is required and where to send it.
f. Any formulation modifications (see 6.5.3.1).
g. Color number and name (see 6.7).
h. Packaging requirements (see 5.1).

6.3 Toxicity evaluation. Health Hazard Assessment (HHA) is a review of a product based on information submitted by the manufacturer at the request of the qualifying activity to assess health hazards associated with the handling, application, use and removal of a product. Sufficient data to permit an HHA of a product should be provided by the manufacturer/distributor and submitted to the Navy and Marine Corps Public Health Center (NAVMCPUBHLTHCEN)

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Industrial Hygiene Department, at email usn.hampton-roads.navmcpubhlthcenpors.list.nmcphc-HHA@mail.mil or Commanding Officer, Navy and Marine Corps Public Health Center, ATTN: Industrial Hygiene-HHA , 620 John Paul Jones Circle, Portsmouth, VA 20378-2103.

To obtain current technical information requirements specified by the NAVMCPUBHLTHCEN or forward any questions concerning toxicity or information required to conduct an HHA, contact: Head, Acquisition Technical Support Division, (757) 953-0978; DSN 377-0978 or email to usn.hampton-roads.navmcpubhlthcenpors.list.nmcphc-HHA@mail.mil.

6.3.1 Toxicity (class H and W only). Some free isocyanate is released during mixing and application of multi-component polyurethane topcoats. Released free isocyanates can produce significant irritation to the skin, eyes, and respiratory tract. Personnel exposed to free isocyanates may develop an allergic pulmonary sensitization, particularly if there is any inhalation of the vapor and mist produced during spray application. This sensitization may cause an asthmatic reaction with wheezing, dyspnea, and cough. Once sensitized, further exposure cannot be tolerated. For this reason, there is a restriction on the issuance and use of this material. Personnel exposed to free isocyanates on a regular basis should receive a periodic medical exam that includes a chest roentgenograph (X-ray), pulmonary function tests, and an evaluation of any respiratory disease or history of allergy. Periodic testing of pulmonary functions may aid in detecting the onset of pulmonary sensitization. Questions pertinent to the effect(s) of these topcoats on the health of personnel using them should be referred by the procuring activity to the appropriate medical service, who will act as an advisor.

6.3.2 Personnel protective equipment (PPE) methods. PPE should always be used when applying protective coatings, regardless of whether the coating contains isocyanates. Additional information pertaining to protective equipment and other necessary precautions should be available from the topcoat application facility's Occupational Safety and Health Office.

6.4 Moisture (class H only). Polyurethane materials should be kept dry. The presence of moisture degrades the quality of the topcoat. Packaging of the materials should be done in a dry atmosphere. Solvents and resins should be examined for evidence of contamination before they are incorporated, even if they are “urethane grade,” as solvents and thinners may become contaminated with water in tank cars or storage tanks. The purchase of "urethane grade" solvents and thinners is no guarantee that excessive moisture is not present. It is recommended that all users check for moisture contamination prior to use.

6.4.1 Method to detect water in solvent used for polyurethane topcoats (class H only). The following is a suggested method that may be used to determine the presence of water in the solvents used for polyurethane topcoats: Add one drop of aluminum secondary butoxide to 100 ml of the solvent in a stoppered flask and shake well. An appreciable amount of turbidity indicates the presence of water.

6.5 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion on the Qualified

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Products List, QPL-85285, in the Qualified Products Database (QPD). The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from the Commander, Naval Air Warfare Center Aircraft Division, Code AB23200, Building 2188, Patuxent River, MD 20670-1908. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at https://assist.dla.mil.

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6.5.1 Qualification inspection samples. The material should be furnished in the type of containers to be used in filling contract orders. Samples should be identified as follows and forwarded to the laboratory designated in the letter of authorization.

> Qualification inspection samples
> Specification MIL-PRF-85285F; Type _____, Class _____, Form_____
> Grade_____, Color _____ "Topcoat, Aircraft and Support Equipment"
> Manufacturer's name and product number
> Submitted by (name and date) for qualification testing in accordance with authorization (reference authorizing letter)

6.5.2 Storage stability, inspection, and other information. In addition to the qualification test samples, the qualifying activity will request the manufacturer to submit to the qualification activity: (a) certification that the manufacturer's material meets the storage stability requirements (see 3.5.2); (b) one copy of the SDS (see 6.6); (c) a certified test report showing that the material conforms to the requirements of this specification; and (d) certification that the following chemicals were not used in the formulation of this topcoat: methylene chloride, trichloroethane and trichlorotrifluoroethane; (e) in the case of Classes NH and NW, certification that product contains no isocyanates.

6.5.3 Retention of qualification. To retain qualification of products approved for listing on the Qualified Products Database (QPD), one of the items that the manufacturer will be requested to verify by certification via DD Form 1718 *Certification of Qualified Products* to the qualifying activity is that its product(s) complies with the requirements of this specification. Unless otherwise specified by the qualifying activity, the time of periodic verification by certification will be in two-year intervals from the date of original qualification and will be initiated by the qualifying activity. Qualification retention information can be found in the SD-6 *Provisions of Qualification.*

6.5.3.1 Retention of qualification for formulation modifications. Manufacturers must request formulation modifications in writing. The request is reviewed and approval is determined by the preparing activity. The approval process may include limited testing of the modified material, complete qualification testing, and/or laboratory data and certification of the performance properties by the manufacturer. Formulation modifications include any change of resin, additive, pigment/fillers, activator/catalyst, supplier(s) of raw materials, solvent etc.

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6.5.3.2 Manufacturer's advertising. The following statement serves as a precaution of any misrepresentation of products procured to this specification. It also informs manufacturers of the qualification requirement for the advertisement of qualified products to this specification. Manufacturers are prohibited from displaying this specification on any product packaging, labeling, technical data sheets or anywhere else in reference to a product that has not been authorized by the qualifying activity on the applicable QPL in the QPD. See DoDM 4120.24 *Defense Standardization Program (DSP) Procedures – Enclosure 14* for additional information on manufacturer's advertising.

6.6 Safety Data Sheet (SDS). 29 CFR 1910.1200 requires that an SDS for each hazardous chemical used in an operation must be readily available to personnel using the material. Contracting officers should identify the activities requiring copies of an SDS.

6.7 Color designation codes. The five digit color designator is the SAE AMS-STD-595 color number. The following is a list of colors frequently used by the Department of Defense, but is not a list of all of the colors authorized, used, or available.

Color type:	SAE AMS-STD-595 color number	Color name
Gloss:	11136	Red
	13538	Orange-yellow
	14187	Green
	15044	Insignia blue
	15180	Blue
	16440	Light gray
	17038	Black
	17925	Untinted white
Semi-gloss:	25200	Blue
	26231	Gray
Camouflage (low gloss)	34095	Field green
	34097	Green
	35237	Blue gray
	36081	Flat gray
	36231	Lusterless gray
	36320	Dark gray
	36375	Medium gray
	36440	Light gray
	36495	Aircraft gray
	37038	Black

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6.8 Batch and lot formation. A batch consists of all topcoat material manufactured during one continuous operation and forming part of one contract or order for delivery. A lot consists of all topcoats of the same color, manufactured at one time from one batch, forming part of one contract, and submitted for acceptance.

6.9 Rejection and retest. Failure in any conformance test should result in rejection of that batch and should constitute justification for removal from the qualified products list. Rejected material should not be resubmitted for acceptance without written approval from the qualification activity (see 6.5). The application for resubmission should contain full particulars concerning previous rejections and measures taken to correct these deficiencies. Samples for retest should be randomly selected and forwarded to the testing activity.

6.10 Safely handling MEK solvent. To minimize exposure to MEK solvent, it is recommended that personnel conducting the solvent resistance (cure) test, as a minimum, wear either butyl rubber or Teflon gloves and a National Institute of Occupational Safety and Health (NIOSH) approved half-face respirator equipped with organic vapor cartridges and goggles or a full-face respirator equipped with organic vapor cartridges.

6.11 Definition of mixed and admixed. In the case of a single component topcoat, mixed/admixed is defined as the coating being thoroughly incorporated for a maximum of five minutes vigorous hand stirring. In the case of a multi-component coating, admixed is defined as all components being added in the manufacturer's specified sequence and ratios, then thoroughly incorporated for five minutes.

6.12 Subject term (key word) listing.

Exterior use
Flammable
Isocyanate
Methyl ethyl ketone

6.13 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issued due to the extent of the changes.

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CONCLUDING MATERIAL

Custodians:
Army - MR
Navy - AS
Air Force - 20

Preparing activity:
Navy - AS

(Project 8010-2021-003)

Review activities:
Army - AR
Navy - CG, MC, SH
Air Force - 84
Other - DS

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://quicksearch.dla.mil.

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