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MIL-PRF-85582D
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SUPERSEDING
MIL-PRF-85582D
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PERFORMANCE SPECIFICATION

PRIMER COATINGS: EPOXY, WATERBORNE

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 corrosion inhibiting, chemical and solvent resistant, waterborne, epoxy primer coatings that have a maximum volatile organic compound (VOC) content of 340 grams per liter (g/L) (2.8 pounds per gallon [lb/gal]).

1.2 Classification. The primer coatings will be of the following types and classes, as specified (see 6.2):

1.2.1 Types. The types of primer coatings are as follows:

Type I - Standard pigments
Type II - Low infrared reflective pigments

1.2.2 Classes. The classes of primer coatings are as follows:

Class C1 - Barium chromate based corrosion inhibitors
Class C2 - Strontium chromate based corrosion inhibitors
Class N - Non-chromate based corrosion inhibitors

Comments, suggestions, or questions on this document should be addressed to: Commander, Naval Air Warfare Center Aircraft Division, Code 491000B120-3, Highway 547, Lakehurst, NJ 08733-5100 or emailed to thomas.omara@navy.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.

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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.

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-A-8625	-	Anodic Coatings for Aluminum and Aluminum Alloys
MIL-PRF-23699	-	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, NATO Code Number 0-156
MIL-DTL-81706	-	Chemical Conversion Materials For Coating Aluminum and Aluminum Alloys
MIL-PRF-83282	-	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537
MIL-PRF-85285	-	Coating: Polyurethane, High-Solids

STANDARDS

FEDERAL

FED-STD-141	-	Paint, Varnish, Lacquer and Related Materials: Methods of Inspection, Sampling and Testing
FED-STD-595	-	Colors Used in Government Procurement

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or http://assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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.

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) INTERNATIONAL

ASTM-B117 - Salt Spray (Fog) Apparatus, Operating. (DoD adopted)
ASTM-D1193 - Reagent Water. (DoD adopted)
ASTM-D1200 - Cup, Viscosity by Ford Viscosity. (DoD adopted)
ASTM-D1210 - Fineness Of Dispersion Of Pigment-Vehicle Systems By Hegman-Type Gage. (DoD adopted)
ASTM-D1296 - Solvents and Diluents, Volatile, Odor of. (DoD adopted)
ASTM-D1475 - Liquid Coatings, Inks, and Related Products, Density of. (DoD adopted)
ASTM-D1640 - Organic Coating, Drying, Curing, or Film Formation of at Room Temperature. (DoD adopted)
ASTM-D1849 - Paint, Package Stability of. (DoD adopted)
ASTM-D2243 - Water Borne Coatings, Freeze-Thaw Resistance of. (DoD adopted)
ASTM-D2369 - Coatings, Volatile Content of. (DoD adopted)
ASTM-D2794 - Deformation, Rapid, Resistance of Organic Coatings to the Effects of (Impact). (DoD adopted)
ASTM-D2803 - Metal, Organic Coatings on, Filiform Corrosion Resistance of. (DoD adopted)
ASTM-D3335 - Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy, Test for Low Concentrations of. (DoD adopted)
ASTM-D3359 Measuring Adhesion by Tape Test, Standard Test Method
ASTM-D3718 - Paint, Chromium in, by Atomic Absorption Spectroscopy, Low Concentrations of. (DoD adopted)
ASTM-D3742 - 1,1,1-Trichloroethane Content
ASTM-D3792 - Water Content of Water-Reducible Paints by Direct Injection Into a Gas Chromatograph. (DoD adopted)
ASTM-D3924 - Paint, Varnish, Lacquer, and Related Materials, Conditioning and Testing, Standard Environment for. (DoD adopted)

(Copies of these documents are available from www.atsm.org or ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQ-Z1.4 - Procedures, Sampling and Tables for Inspection by Attributes. (DoD adopted)

(Copies of this document are available from www.asq.org or the American Society for Quality, 600 Plankinton Avenue, Milwaukee, WI 53203.)

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SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) INTERNATIONAL

SAE-AMS-QQ-A-250/4 - Aluminum Alloy 2024, Plate and Sheet. (DoD adopted)
SAE-AMS-QQ-A-250/5 - Aluminum Alloy Alclad 2024, Plate and Sheet. (DoD adopted)

(Copies of these documents are available from http://www.sae.org or from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

2.4 Order of precedence. 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.

3. REQUIREMENTS

3.1 Qualification. The primer coating furnished under this specification shall be a product that is authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.3).

3.2 Material. Materials used in the manufacture of products supplied under this specification shall produce products conforming to the requirements of this specification.

3.2.1 Toxicity. The coatings shall have no adverse effect on the health of personnel when used for their intended purpose when evaluated in accordance with 4.5.13 (see 6.9). The coatings shall contain no free isocyanates.

3.3 Composition. The primer coating shall consist of two components, as follows:

Component A - a base component of epoxy resin solution
Component B - a curing agent

The components shall be packaged separately and furnished as a kit (see 6.6.1). When the components are mixed in the proportions specified by the manufacturer and reduced with water conforming to ASTM-D1193, type IV, if required, a product meeting the requirements of this specification shall result. Chlorinated solvents, except for para-chlorotrifluoromethylbenzene or equal, shall be prohibited from the formulation of this primer coating. Incidental cadmium and cadmium compounds shall be not greater than one part per million (ppm). The non-volatile portion shall contain not more than 0.05 percent by weight of lead metal or lead compounds.

3.3.1 Pigment. The pigment of the primer coating shall be contained in component A or B.

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3.3.1.1 Class C1. Coatings containing barium chromate as the corrosion inhibitor and other pigments, as required, shall be identified as class C1.

3.3.1.2 Class C2. Coatings containing strontium chromate as the corrosion inhibitor and other pigments, as required, shall be identified as class C2.

3.3.1.3 Class N. Coatings containing non-chromium corrosion inhibitors, along with extenders and other pigments, shall be identified as class N. Incidental hexavalent chromium content of class N shall be not greater than 5 ppm.

3.3.2. Solvent content. The volatile organic compound (VOC) content of the admixed primer coating shall be not greater than 340 g/L (2.8 lb/gal) of coating, excluding water (see 4.5.1).

3.4 Physical properties – components before mixing.

3.4.1 Fineness of grind. The fineness of grind of the pigmented component shall be 5 or greater on the Hegman scale when tested in accordance with table I.

3.4.2 Condition in container. Components A and B shall be free of grit, seeds, lumps, abnormal thickening, or livering, and shall not show pigment flotation nor excessive settling. They shall mix to a smooth, homogeneous, and pourable condition (see 4.5.2). In addition, the containers shall exhibit no deformation.

3.4.3 Storage stability. The unopened coating components, as packaged by the manufacturer, shall meet all requirements of this specification after storage for a period of one year. The conditions for the storage shall be a daily ambient air temperature that is maintained at 1.7 to 46 ^{o}C (35 to 115 ^{o}F) (see 4.5 and 6.3).

3.4.4 Accelerated storage stability. The primer coating, as packaged by the manufacturer, shall meet all requirements of this specification after storage for 14 days (see 4.5.14). The container shall not become deformed and the lid shall not become unsealed during the storage period.

3.4.5 Freeze-thaw stability. The primer coating components, as supplied by the manufacturer, shall meet all the requirements specified herein after being subjected to five cycles of freezing and thawing and when tested in accordance with table I.

3.5 Physical properties - admixed components.

3.5.1 Color.

3.5.1.1 Type I. The color of the admixed type I primer coating shall be the natural color of the corrosion inhibiting pigments used or darker.

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3.5.1.2 Type II. The color of the admixed type II primer coating shall be dark green or gray.

3.5.2 Odor. The odor of the primer coating, as packaged components or as a film after application, shall be characteristic of the thinners used, when tested in accordance with table I.

3.5.3 Viscosity and pot life. The viscosity of the admixed primer coating, when thinned in accordance with the manufacturer's instructions and stirred constantly at 140 ±30 revolutions per minute (rpm) in an open or closed container, shall not increase by more than 8 seconds through a number 4 Ford cup after 4 hours at 23 ±2 °C (73 ±5 °F). At the end of the 4-hour period, the applied primer coating shall meet all of the requirements of 3.7.1 through 3.7.4, when tested in accordance with table I.

3.6 Physical properties - film.

3.6.1 Surface appearance. The admixed primer coating, applied to a vertical surface, shall not sag, run, nor streak. The dried film shall be free of grit, seeds, craters, blisters or any other surface irregularities when applied in accordance with 4.4.1. No orange peel (wavy appearance) shall be visible when viewed from at least six feet away.

3.6.2 Drying time. The applied primer coating shall be tack-free within 60 minutes and shall dry hard within 6 hours, when tested in accordance with table I.

3.6.3 Lifting. There shall be no evidence of lifting nor any other film irregularity upon application of a gloss polyurethane coating conforming to MIL-PRF-85285 to a primer coating that has air dried for 2, 4, and 18 hours, respectively (see 4.5.3).

3.6.4 Adhesion. The primer coating shall have a rating of no less than 4A when examined in accordance with ASTM-D3359 (see 4.5.4).

3.6.5 Flexibility. The primer coating shall exhibit an impact elongation of not less than 10 percent, when tested in accordance with 4.5.5.

3.6.6 Infrared reflectance (type II primer coating only). The total reflectance (specular and diffuse) of the type II primer coating, relative to barium sulfate, shall be not greater than ten percent throughout the range of 700 to 2,600 nanometers (nm) (see 4.5.6).

3.7 Resistance properties.

3.7.1 Water resistance. The primer coating, with topcoat, shall withstand immersion in distilled water maintained at 49 ±3 °C (120 ±5 °F) for four days without exhibiting any evidence of wrinkling, blistering, or any other coating deficiency (see 4.5.7).

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3.7.2 Corrosion resistance.

3.7.2.1 Salt spray. The primer coating, with and without a topcoat, shall not exhibit blistering, lifting of either coating, or substrate pitting after exposure to a 5 percent salt spray for 2,000 hours. Class C1 and class C2 primer coatings shall not exhibit corrosion in the scribe (see 4.5.8.1).

3.7.2.2 Filiform. The topcoated primer coating shall not exhibit filiform corrosion extending beyond 6.35 millimeters (mm) (0.25 inch) from the scribe, and the majority of the filaments shall be less than 3.175 mm (0.125 inch) in length (see 4.5.8.2).

3.7.3 Solvent resistance (cure). The primer coating shall withstand 50 passes (25 back and forth rubs) with a cloth rag soaked in methyl ethyl ketone (MEK). Rubbing through to bare substrate constitutes failure of the primer coating to properly cure (see 4.5.9).

3.7.4 Fluid resistance. The primer coating shall withstand immersion for 24 hours in each of synthetic lubricating oil conforming to MIL-PRF-23699 and synthetic hydraulic fluid conforming to MIL-PRF-83282. Four hours after removal from the respective fluid, the coating shall not exhibit any softening, blistering, loss of adhesion, nor any other coating deficiency. Discoloration of the coating is acceptable and shall not be cause for rejection (see 4.5.10).

3.8 Working properties.

3.8.1 Mixing and dilution. The components of the primer coating shall homogeneously blend when mixed with a mechanical mixer in the volume mixing ratio specified by the manufacturer. When the admixed primer coating is diluted to application viscosity with water (according to the manufacturer's instructions), there shall be no evidence of incompatibility and the material shall be capable of application by spray methods (see 3.8.2). Transient incompatibility exhibited during the first half of water addition is allowed. The primer coating shall not separate into visually distinct layers within one hour after water dilution (see 4.5.11).

3.8.2 Application. The admixed primer coating shall be applied by conventional, airless, high volume, low pressure (HVLP), or electrostatic spray equipment installed for water systems. Application shall yield a smooth, uniform film with no runs or sags at a dry-film thickness of 15 to 23 microns (µm) (0.6 to 0.9 mil) (see 4.4.1).

3.9 Identification of material. Individual containers greater than one pint and cases of containers less than one pint shall be identified with the following information:

MIL-PRF-85582D, Primer Coatings: Epoxy, Waterborne
Component identification (as applicable):
Component A - base component
Component B - curing agent
MIL-PRF-85582D, type I or II, class C1, C2, or N (as applicable)

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Manufacturer's name and product number
Date of manufacture (month/year)
Batch number/net contents
VOC content in grams/liter
Mixing and thinning instructions

3.9.1 Component A containers. Component A containers shall have the following warning:

"WARNING! COMBUSTIBLE"

3.9.2 Component B containers. Component B containers shall have the following warning:

"WARNING! FLAMMABLE"

3.10 Precaution sheet. A printed precaution sheet with the following information shall be included with each kit (see 6.6.1) as follows:

PRECAUTIONS

a. The surface to be coated must be clean (free of oil, dust, etc.).
b. Spray equipment must be properly grounded. Clean equipment immediately after use.
c. Mix only the amount of primer coating to be used within 4 hours.
d. Primer coating from one vendor, or individual component, must never be mixed with that of another vendor.
e. Apply over pretreated metal. On fiberglass-reinforced plastic, a prior coating of wash primer in accordance with MIL-C-8514 will facilitate stripping without damage to the fiberglass.

3.11. Strippability. A minimum of 90 percent of the coating shall be stripped when tested in accordance with 4.5.12.

4. VERIFICATION

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

a. Qualification inspection (see 4.2).
b. Conformance inspection (see 4.3).

4.2 Qualification inspection. Qualification inspection shall consist of all the inspections listed in this specification. The qualification inspection performed by the qualification laboratory (see 6.3) shall consist of a review for approval of the submitted manufacturer's test report and subjecting the qualification test sample to examination and testing to determine conformance to all of the requirements specified in section 3. The qualification test sample shall

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consist of not less than one quart (admixed) of the primer coating material. The samples shall be legibly identified (see 6.3.2).

4.3 Conformance inspection.

4.3.1 Primer coating inspection. The conformance inspection shall consist of all the tests specified in table I, with the exception of toxicity (3.2.1), storage stability (see 3.4.3), accelerated storage stability (see 3.4.4), freeze-thaw stability (see 3.4.5), corrosion resistance (see 3.7.2.1 and 3.7.2.2), and strippability (3.11). Samples for tests shall consist of one complete unopened kit selected at random from each batch. Containers shall only be opened when being tested.

4.3.2 Visual inspection of filled containers. Samples shall be selected at random from each lot (see 6.10) in accordance with ASQ-Z1.4, inspection level S-2. The lot size for this inspection shall be the number of kits fully prepared for delivery. The selected samples shall be examined for container fill, proper location, and completion of item identification (see 3.9), warning statements (see 3.9.1 and 3.9.2), and the precaution sheet (see 3.10).

4.4 Test panels. Test panels shall be prepared under laboratory test conditions (see 4.5). With the exception of the flexibility test (see 4.5.5) and the filiform corrosion test (see 4.5.8.2), all test panels shall be aluminum alloy 2024 (T3 temper) conforming to SAE-AMS-QQ-A-250/4, measuring 0.51 by 76.2 by 152.4 mm (0.020 by 3 by 6 inches). Test panels shall be conversion coated with coating conforming to MIL-DTL-81706, class 1A.

4.4.1 Application of primer coating. The primer coating shall be prepared for application by:

a. Thoroughly mixing each component separately.
b. Mixing the components in the manufacturer's specified volume mixing ratio.
c. Thinning with water in accordance with the manufacturer's instructions (water reducible only).
d. Allowing admixed coating to stand for 30 minutes prior to use.
e. Spraying the test panels with primer coating to a dry-film thickness of 15 to 23 µm (0.6 to 0.9 mil).

If a topcoat is not used, the primer coating shall be allowed to air dry for not less than 14 days, or air dry for not less than one hour followed by 24 hours at 65.5 ±3 °C (150 ±5 °F) prior to testing. If a topcoat is required, the primer coating shall be air-dried for 2 hours and then coated with a polyurethane coating conforming to MIL-PRF-85285 in accordance with 4.4.2.

4.4.2 Application of topcoat. When a topcoat is required by the test method, mix polyurethane coating conforming to MIL-PRF-85285, untinted gloss white conforming to FED-STD-595, color number 17925, and allow it to stand for 30 minutes prior to application. Apply the coating to a total dry-film thickness of 43 to 58 µm (1.7 to 2.3 mils). If applied in two coats, allow the first coat to air dry for 60 minutes prior to application of the second coat. After

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application of the topcoat to the required thickness and prior to testing, allow the coating to air dry for not less than 14 days or allow the coating to air dry for one hour followed by 24 hours at 65.5 ±3 °C (150 ±5 °F).

4.5 Test methods. The tests of this specification shall be conducted in accordance with table I and 4.5.1 through 4.5.10. Unless otherwise specified in the test method or paragraph, laboratory test conditions shall be in accordance with ASTM-D3924.

TABLE I. Test methods.

Test	Requirement Paragraph	Test Paragraph	FED-STD-141 Test Method	ASTM Method
Toxicity	3.2.1	4.6.8	---	---
Lead and cadmium content	3.3	---	---	ASTM-D3335
Chlorinated solvent content	3.3	---	---	ASTM-D3742
Chromium content	3.3.1.3	---	---	ASTM-D3718
Solvent content	3.3.2	4.5.1	---	---
Fineness of grind	3.4.1	---	---	ASTM-D1210
Condition in container	3.4.2	4.5.2	---	---
Storage stability	3.4.3	---	3022	---
Accelerated storage stability 1/	3.4.4	4.5.14	---	ASTM-D1849
Freeze-thaw stability	3.4.5	---	---	2/ ASTM-D2243
Odor	3.5.2	---	---	ASTM-D1296
Viscosity and pot life	3.5.3	---	---	ASTM-D1200
Surface appearance	3.6.1	4.4.1	---	---
Drying time	3.6.2	---	---	ASTM-D1640
Lifting	3.6.3	4.5.3	---	---
Adhesion	3.6.4	4.5.4	---	ASTM-D3359
Flexibility	3.6.5	4.5.5	---	---
Infrared reflectance (type II only)	3.6.6	4.5.6	---	---
Water resistance	3.7.1	4.5.7	---	---
Salt-spray corrosion resistance	3.7.2.1	4.5.8.1	---	---
Filiform corrosion resistance	3.7.2.2	4.5.8.2	---	---
Solvent resistance (cure)	3.7.3	4.5.9	---	---
Fluid resistance	3.7.4	4.5.10	---	---
Mixing and dilution	3.8.1	4.5.11	---	---
Application	3.8.2	4.4.1	---	---
Strippability	3.11	4.5.12	---	---

1/ The primer coating shall be mixed with a mechanical shaker for 10 minutes instead of 300 stirs in 2 minutes.

2/ One freeze-thaw cycle shall be 16 hours at -9 ±3 °C (15 ±5 °F) followed by 8 hours at a room temperature of 18 to 29.5 °C (65 to 85 °F).

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4.5.1 Solvent content. The unthinned, admixed primer coating, in accordance with the manufacturer's instructions, shall be used for this test. The VOC content of the primer coating shall be calculated as follows:

VOC (g/L) = A ÷ B

Where:
A = $[(100 - X_M - W_{H_2O}) \div 100]$
B = $[(1 \div P_M) - (W_{H_2O} \div 100{,}000)]$
X_M = Solids content of the admixed primer coating (weight percent) determined in accordance with ASTM-D2369, procedure B.
P_M = Density of admixed primer coating (g/L), determined in accordance with ASTM-D1475.
W_{H_2O} = Water content of the admixed primer coating (percent by weight), determined in accordance with ASTM-D3792.

4.5.2 Condition in container. Each component in its unopened container shall stand without agitation for not less than 14 days at room temperature (see 4.5). After this period, the container(s) shall be examined for bulging or other deformation due to internal pressure. Each component container shall be opened and examined, then mixed by hand, vigorously stirring with a paddle for not more than 5 minutes and shall conform to 3.4.2.

4.5.3 Lifting. The primer coating shall be applied to test panels in accordance with 4.4 and 4.4.1, with the exception of drying time, noted as follows: Topcoat shall be applied in accordance with 4.4.2 to primer coating that has air dried for 2, 4, and 18 hours, respectively. After the topcoat has fully cured, the test panels shall be examined for conformance to 3.6.3.

4.5.4 Adhesion. The primer coating shall be applied to the test panels in accordance with 4.4 through 4.4.1. The test panels shall be immersed in distilled water for no less than 24 hours at a room temperature of 18 to 29.5 ^{o}C (65 to 85 ^{o}F). Remove the test panels from the water and wipe dry with a soft cloth. Within 3 minutes after removal from the water make two parallel scribes with a stylus, through the coating 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". Immediately apply a 1-inch wide strip of masking tape with the adhesive side down across the scribes. Press the tape against the surface of the coating by passing a roller across the tape eight times. The masking tape and roller shall be as specified in FED-STD-141, method 6301.3. Remove the tape with one quick motion and examine for coating damage. Examine the coating for conformance to 3.6.4.

4.5.5 Flexibility. Test panels, constructed of aluminum alloy 2024 (O temper) conforming to SAE-AMS-QQ-A-250/4 and measuring 0.51 by 76.2 by 152.4 mm (0.020 by 3 by 6 inches), shall be anodized in accordance with MIL-A-8625, type I. Primer coating shall then be applied to the test panels in accordance with 4.4.1. The flexibility of the coating shall then be tested at the room temperature and relative humidity conditions as specified in ASTM-D3924, using a Gardco GE Universal Impact Tester, Model #172 (see 6.7), with a specialized impacter that

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weighs 3.6 lb, and has formed on each end four convex spherical segments, each of different radii and extension. 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. 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 3.6.5; record the percent elongation corresponding to the largest spherical impression at which no cracking occurs.

4.5.6 Infrared reflectance (type II primer coating only). The type II primer coating shall be applied to test panels prepared in accordance with 4.4 and 4.4.1. The total reflectance (specular and diffuse) of the primer coating relative to barium sulfate shall be measured using a near infrared spectrophotometer over a range of 700 to 2,600 nm. Examine for conformance to 3.6.6.

4.5.7 Water resistance. Test panels shall be prepared with primer coating (see 4.4 and 4.4.1). One half of the primer coated panels shall be topcoated (see 4.4 through 4.4.2). All panels shall be immersed in distilled water maintained at 49 ±3 °C (120 ±5 °F) for four days. Two hours after removal from the water, the coatings shall be examined for conformance to 3.7.1.

4.5.8 Corrosion resistance.

4.5.8.1 Salt spray. Test panels shall be prepared with primer coating (see 4.4 and 4.4.1). One half of the primer coated panels shall be topcoated (see 4.4.2). Two intersecting lines shall be scribed diagonally across the surface of the primer coating, exposing the bare substrate. The test panels shall then be placed in a 5 percent salt spray cabinet for 2,000 hours, in accordance with ASTM-B117. After removal from the salt spray cabinet, the test panels shall be examined for conformance to 3.7.2.1.

4.5.8.2 Filiform. Test panels, constructed from Alclad aluminum alloy 2024 (T3 temper) conforming to SAE-AMS-QQ-A-250/5, with dimensions of 0.51 by 76.2 by 152.4 mm (0.020 by 3 by 6 inches), shall be conversion coated in material coating conforming to MIL-DTL-81706, class 1A. Primer coating and topcoat shall then be applied to the test panels in accordance with 4.4.1 and 4.4.2. Two intersecting lines shall be scribed across the surface of each test panel and shall penetrate through the cladding and into the base metal. The test panels shall be placed vertically in a desiccator containing 12 Normal (N) HCl for one hour at 24 ±3 °C (75 ±5 °F). Within five minutes of removal from the desiccator, the test panels shall be placed in a desiccator maintained at 40 ±2 °C (104 ±3 °F) and relative humidity of 80 ±5 percent for 1,000 hours. The test panels shall then be examined for conformance to 3.7.2.2. Filiform corrosion appears as thread-like filaments initiating from the exposed substrate and spreading underneath the coating film. A description of filiform growth is described in ASTM-D2803.

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4.5.9 Solvent resistance (cure). The primer coating shall be applied to test panels in accordance with 4.4 and 4.4.1. The primer coating shall then be examined for cure, as follows:

a. Soak a cotton cloth rag in MEK solvent (see 6.8).
b. Rub the coating with the soaked rag for 50 passes (25 back and forth rubs) with firm finger pressure.
c. Examine coating for conformance to 3.7.3.

4.5.10 Fluid resistance. The primer coating shall be applied to test panels in accordance with 4.4 and 4.4.1. The test panels shall then be separately immersed to half their length for 24 hours in glass covered beakers containing the following:

a. Lubricating oil conforming to MIL-PRF-23699 maintained at 121 ±3 °C (250 ±5 °F)
b. Hydraulic fluid conforming to MIL-PRF-83282 maintained at 66 ±3 °C (150 ±5 °F)

After removal from the test fluids, cool the test panels to a room temperature of 18 to 29.5 °C (65 to 85 °F) and examine for conformance to 3.7.4.

4.5.11 Mixing and dilution. Stir component A until completely uniform. Mix component A with component B in the volume mixing ratio specified by the manufacturer and examine for conformance to 3.8.1. Thin as specified by the manufacturer. Stir and allow the admixed primer coating to sit for 30 minutes. Examine for conformance to 3.8.2.

4.5.12 Strippability. Prepare two test panels with the primer coating only (see 4.4 and 4.4.1). All of the test panels shall then be aged at room temperature for seven days followed by seven days at 65.5 °C (150 °F). 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 coating 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 coating surface. After no less than 4 hours of exposure, the panel shall then be scraped with a rubber scraper to remove loosened coating; apply additional remover conforming to the control formulation of
TT-R-2918, type I, to cover any remaining coating 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 coatings 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 3.11.

4.5.13 Toxicity. The product shall be evaluated by the Navy Environmental Health Center (NAVENVIRHLTHCEN) using the administrative Health Hazard Assessment (HHA) (see 6.9).

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4.5.14 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 to room temperature (see 4.5). 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 3.4.4.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual 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 primer coatings covered by this specification are corrosion-inhibiting and chemical resistant, intended for spray application to most aircraft substrates. These coatings are compatible with polyurethane and epoxy topcoats (see 6.1.1) and may be used as alternatives to MIL-PRF-23377 for many applications. However, primer coatings containing water, such as these coatings, should not be used on iron or bare carbon steel, nor for the wet installation of fasteners or faying surfaces. Type II primer coatings are intended for use where low infrared reflectance is required. Class N may not be substituted for Class C1 or C2, unless authorization for its use is given by the engineering authority for the system or item to which the primer coating is to be applied. These primer coatings are formulated for the unique performance requirements of military aircraft. These requirements include adhesion to a wide variety of metals and composites, flexibility to withstand tactical maneuvers at low temperatures, corrosion resistance in a marine environment, resistance to leaking aircraft fluids, and low-infrared reflectance for stealth in combat.

6.1.1 Compatibility. The primer coatings covered by this specification are compatible with coatings conforming to the following specifications:

MIL-PRF-22750 Coating, Epoxy, High-Solids
MIL-DTL-64159 Coating, Water Dispersible Aliphatic Polyurethane, Chemical Agent Resistant
MIL-C-53039 Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant

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MIL-PRF-85285 Coating: Polyurethane, High-Solids
TT-P-2756 Coating: Self-Priming Topcoat, Low Volatile Organic Compounds

Compatibility with other coatings should be tested prior to use.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of the specification.
b. Type and class required (see 1.2).
c. Packaging requirements (see 5.1).
d. Any formulation modifications (see 6.4.1).
e. Quantity and kit size identification (see 6.6.1).

6.3 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 in Qualified Products List QPL-85582 whether or not such products have actually been so listed by that date. 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 purchase 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 4.9.7.2, Building 2188, Patuxent River, MD 20670-1908.

6.3.1 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) a certified test report showing that the material conforms to the requirements of this specification; (b) one copy of the MSDS (see 6.9.1); (c) certification that the manufacturer's material meets the storage stability requirements (see 3.4.3).

6.3.2 Qualification inspection sample identification. Qualification inspection samples are to be forwarded to the laboratory designated in the letter of authorization (see 6.3) and identified as follows:

Qualification test samples.
Specification MIL-PRF-85582D, type I or II, and class C1, C2, or N (as applicable).
Primer Coatings: Epoxy, Waterborne.
Manufacturer's name and product number
Submitted by (name and date) for qualification testing in accordance with authorization (reference authorizing letter).

6.4 Retention of qualification. To retain qualification approval of products listed on the Qualified Products List (QPL), the manufacturer will be required to verify by certification to the qualifying activity that its product(s) complies with the requirements of this specification. Unless otherwise specified by the qualifying activity, the time of periodic verification by

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certification will be in two-year intervals from the date of original qualification. The certification action will be initiated by the qualifying activity. Any change in the formulation of a qualified product will necessitate its requalification. The material supplied under contract must be identical, within manufacturing tolerances to the product receiving qualification.

6.4.1 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.

6.5 Conformance rejection and retest. Failure in any conformance inspection will result in the rejection of the batch from which it was obtained and constitutes sufficient justification for removal from the Qualified Products List. Rejected material cannot be resubmitted for acceptance without written approval from the qualification activity (see 6.3). The application for resubmission will contain all details concerning previous rejections and measures taken to correct these deficiencies.

6.6 Part or Identifying Number (PIN). The PIN to be used for primer coatings acquired to this specification is created as follows:

M85582	-	X	-	XX	-	XXXX
Specification identifier		Type designator 1 = Type I 2 = Type II		Class designator (C1, C2, or N)		Kit size designator (see 6.6.1)

6.6.1 Kit size. The primer coatings covered by this specification should be purchased by volume, the unit being a kit containing two 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 follows:

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

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

2/ Designators for less than pint size kits (small touch up kits) are expressed in cubic centimeters (cc) and designated by “C.” Example: A type I, class C1, 50 cc kit is designated M85582-1-C1-050C.

6.7 Impact tester source. An instrument for conducting the test in accordance with ASTM-D2794 (see 4.5.5) is the Gardco GE Universal Impact Tester, Model #172, available

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from the Paul N. Gardner Company, 316 NE First Street, P.O. Box 10688, Pompano Beach, FL 33061-6688. There may be other instruments equivalent to this unit.

6.8 Safely handling MEK solvent. To minimize exposure to MEK solvent, it is recommended that personnel conducting the solvent resistance (cure) test (see 4.5.9) wear either butyl rubber or Teflon® gloves and a half-face respirator equipped with organic vapor cartridges.

6.9 Toxicity evaluation. A flowchart for the HHA process can be found as enclosure (1) of BUMEDINST 6270.8. The HHA is a review of the product based on information submitted by the manufacturer, to assess health hazards associated with the handling, application, use and removal of the product. Sufficient data to permit an HHA of the product should be provided by the manufacturer/distributor to the NAVENVIRHLTHCEN. To obtain current technical information requirements specified by the NAVENVIRHLTHCEN or any questions concerning toxicity, information required to conduct a HHA, and requests for a HHA should be addressed to the Commanding Officer, Navy Environmental Health Center, ATTN: Hazardous Materials Department, Industrial Hygiene Directorate, 620 John Paul Jones Circle, Suite 1100, Portsmouth, VA 20378-2103. Upon receipt of the HHA, a copy should be provided to Commander, Naval Sea Systems Command, ATTN: SEA 05M1, 1333 Isaac Hull Ave., SE, Stop 5133 Washington Navy Yard, DC 20376-5133.

6.9.1 Material Safety Data Sheet (MSDS). An MSDS must be prepared and submitted in accordance with FED-STD-313. The MSDS must also meet the requirements of 29 CFR 1910.1200. The 29 CFR 1910.1200 requires that the MSDS for each hazardous chemical used in an operation must be readily available to personnel using the material. Questions pertinent to the effect(s) of these coatings on the health of personnel using them may be referred by the procuring activity to the appropriate medical service, who will act as its adviser. Contracting officers will identify the activities requiring copies of the MSDS.

6.10 Lot and batch formation. A lot will consist of all of the primer coatings manufactured at one time from one batch, forming part of one contract or purchase order and submitted for acceptance. A batch consists of all primer coatings manufactured during one continuous operation.

6.11 Subject term (key word) listing.

Barium chromate
Corrosion inhibitive
Hydrochloric acid
Low infrared reflectance
Methyl ethyl ketone (MEK)
Strontium chromate
Water reducible

6.12. Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the government assumes no liability whatsoever for any inaccuracies in these notations.

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Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Custodians:
Army - MR
Navy - AS
Air Force - 99

Review activities:
Army - MD1
Navy - CG, OS, SH
Air Force - 11, 84
GSA - FSS (9FTE-10)
Other - DS

Preparing activity:
Navy - AS
(Project 8010-2006-016)

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 ASSIST Online database at http://assist.daps.dla.mil.