INCH-POUND

MIL-DTL-53022E
19 January 2012
SUPERSEDING
MIL-DTL-53022D
7 May 2010

DETAIL SPECIFICATION

PRIMER, EPOXY COATING, CORROSION INHIBITING LEAD AND CHROMATE FREE

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

1. SCOPE

1.1 Scope. This specification covers a flash drying, corrosion inhibiting epoxy primer for ferrous and nonferrous substrates. The primer is lead and chromate free and meets the air pollution requirements for solvent emissions.

1.2 Types. The coating will be furnished in the following types as specified (see 6.2). Whenever one of the following coating types is not cited in a relevant contractual document or drawing, select type IV.

Type II	-	High solids, lead and chromate free formulation to meet a maximum volatile organic compound (VOC) content of 420 grams/liter (g/l) (3.5 pounds/gallon (lbs/gal)) as packaged.
Type III	-	High solids, lead and chromate free, hazardous air pollutant-free (HAP-free) formulation to meet a maximum VOC content of 340 g/l (2.8 lbs/gal) as packaged.
Type IV	-	High solids, enhanced corrosion performance, lead and chromate free, HAP-free formulation to meet maximum VOC content of 340 g/l (2.8 lbs/gal) as packaged. The enhanced corrosion performance includes 1,000 hours salt spray and 40 cycles on the cyclic corrosion test.
Type V	-	Self contained portable kits. The kits contain the type IV corrosion inhibiting epoxy primer in a touch-up system.

Comments, suggestions, or questions on this document should be addressed to: Director, U.S. Army Research Laboratory, Weapons and Materials Research Directorate, Materials Manufacturing Technology Branch, Specification and Standards Office, ATTN: RDRL-WMM-D, Aberdeen Proving Ground, MD 21005-5069 or emailed to richard.j.squillacioti.civ@mail.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.daps.dla.mil/.

1.2.1 Part or identifying number (PIN). Use the following example to create the PINs to be used for coatings acquired to this specification. When other container sizes are required, change the designator accordingly, such as 1/2P for 1/2 pint.

M53022	-	X	-	XXXX	-	XXXXX
Specification Identifier		Coating type designator Type II = 2 Type III = 3 Type IV = 4 Type V = 5		Container size designator 1 quart = 001Q 1 gallon = 001G		Color designator FED-STD-595 color chip number

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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 SPECIFICATIONS

TT-C-490 - Chemical Conversion Coatings and Pretreatments for Ferrous Surfaces (Base for Organic Coatings).

FEDERAL STANDARDS

FED-STD-313 - Material Safety Data, Transportation Data, And Disposal Data For Hazardous Materials Furnished to Government Activities.
FED-STD-595/26622 - Gray, Semi-gloss.
FED-STD-595/34094 - Green, Flat or Lusterless.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-5541 - Chemical Conversion Coatings on Aluminum and Aluminum Alloys.
MIL-DTL-12468 - Decontaminating Agent, STB.
MIL-DTL-53039 - Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant.
MIL-DTL-64159 - Camouflage Coating, Water Dispersible Aliphatic Polyurethane, Chemical Agent Resistant.
MIL-T-81772 - Thinner, Aircraft Coating.

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

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.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA Method 311 - Analysis of Hazardous Air Pollutant Compounds in Paints and Coatings by Direct Injection into a Gas Chromatograph.

(Copies of this document are available online at http://www.epa.gov/ttn/emc/ or from the Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460.)

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.

ASTM INTERNATIONAL

ASTM A109/ A109M	-	Standard Specification for Steel, Strip, Carbon (0.25 Maximum Percent), Cold Rolled. (DoD adopted)
ASTM A1008/ A1008M	-	Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable. (DoD adopted)
ASTM B117	-	Standard Practice for Operating Salt Spray (Fog) Apparatus. (DoD adopted)
ASTM D522	-	Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings. (DoD adopted)
ASTM D523	-	Standard Test Method for Specular Gloss. (DoD adopted)
ASTM D562	-	Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer Type Viscometer. (DoD adopted)
ASTM D610	-	Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces. (DoD adopted)
ASTM D1210	-	Standard Test Method for Fineness of Dispersion of Pigment Vehicle Systems by Hegman Type Gage. (DoD adopted)
ASTM D1308	-	Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes. (DoD adopted)
ASTM D1394	-	Standard Test Methods for Chemical Analysis of White Titanium Pigments. (DoD adopted)
ASTM D1475	-	Standard Test Method for Density of Liquid Coatings, Inks, and Related Products. (DoD adopted)
ASTM D1652	-	Standard Test Method for Epoxy Content of Epoxy Resins. (DoD adopted)

ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments. (DoD adopted)
ASTM D1849 - Standard Test Method for Package Stability of Paint. (DoD adopted)
ASTM D2371 - Standard Test Method for Pigment Content of Solvent Reducible Paints. (DoD adopted)
ASTM D2698 - Standard Test Method for Determination of the Pigment Content of Solvent Reducible Paints by High Speed Centrifuging. (DoD adopted)
ASTM D3271 - Standard Practice for Direct Injection of Solvent Reducible Paints into Gas Chromatograph for Solvent Analysis. (DoD adopted)
ASTM D3335 - Standard Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy. (DoD adopted)
ASTM D3359 - Standard Test Methods for Measuring Adhesion by Tape Test.
ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test. (DoD adopted)
ASTM D3924 - Standard Specification for Standard Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials. (DoD adopted)
ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings. (DoD adopted)
ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films. (DoD adopted)
ASTM D5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.
ASTM D7232 - Standard Test Method for Rapid Determination of the Nonvolatile Content of Coatings by Loss in Weight.
ASTM G90 - Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight.

(Copies of these documents are available from www.astm.org or ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.)

GENERAL MOTORS ENGINEERING STANDARDS
GMW 14872 - Cyclic Corrosion Laboratory Test.

(Copies of this document are available from www.ihs.com or General Motors International, General Motors Technical Center, Warren, MI 48092.)

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.

3. REQUIREMENTS

3.1 Qualification. The primer furnished under this specification shall be a product which is qualified for listing on the applicable Qualified Products Database (QPD) before contract award (see 4.2 and 6.4). Any change in the formulation of a qualified product shall necessitate its

requalification. The material supplied under contract shall be identical, within manufacturing tolerances, to the product receiving qualification.

3.2 Color characteristics. The color of the primer shall be characteristic of titanium dioxide pigments or a light beige or gray not darker than color chip number 26622 of FED-STD-595.

3.3 Composition. The primer shall be furnished in 2 components: component A (a pigmented epoxy resin component) in 1 quart, 1 gallon, 4 gallon or 5 gallon primary containers (see 6.2), and component B (catalyst component) in 1/2 pint, 1 quart or 1 gallon primary containers (see 6.2). When mixed four parts by volume of component A to one part by volume of component B, a product meeting the applicable requirements of this specification shall result.

3.3.1 Pigment. The pigment portion of component A shall conform to the percent by weight requirements specified in table I. When the component A of the primer is tested in accordance with section 4, the analysis shall conform to the requirements of table I. Hexavalent chromium shall not be present for all types. Pigments contained in these primers shall be HAP-free for types III and IV. Compounds of antimony, arsenic, beryllium, cadmium, cobalt, chromium, cyanide, lead, manganese, mercury, nickel and selenium shall be absent. Small amounts of tinting pigments are permissible to achieve the color as in 3.2.

TABLE I. Pigment composition.

Characteristics	Type II		Type III / IV	
Percent by weight/pigment	Percent by weight		Percent by weight	
	Min	Max	Min	Max
Titanium dioxide	32.0	-	16.0	-
Zinc phosphate 1/	5.0	-	5.0	-
Corrosion inhibiting pigment 2/	0.5	-	0.5	-
Siliceous extenders	-	45.0	-	60.0

1/ Zinc phosphate or metal phosphate complex.
2/ Heucorin RZ, Heubach GmbH Company or equivalent.

3.3.2 Vehicle.

3.3.2.1 Component A (epoxy resin component). Component A shall consist of a bisphenol type epoxy resin and pigment combined with necessary amounts of flow control agents and volatile solvents to meet the requirements of this specification.

3.3.2.2 Component B (catalyst component). For type II, component B shall consist of an aliphatic polyamide-epoxy resin adduct combined with the necessary amounts of volatile solvents to meet the requirements of the specification. For types III and IV, component B shall consist of any suitable epoxy curative along with the necessary amounts of volatile solvents to meet the requirements of the specification.

3.3.2.3 Volatile content. The volatile content of the mixed primer shall conform to the following requirements when tested as in table V.

3.3.2.3.1 For type II. The VOC content shall not exceed 420 g/l (3.5 lbs/gal) as packaged (see 4.7.3.1).

3.3.2.3.2 For type III and IV. The VOC content shall not exceed 340 g/l (2.8 lbs/gal) as packaged (see 4.7.3.1).

3.3.2.3.3 Volatile organic hazardous air pollutant-free (VOHAP-free). Type III and IV coatings shall be VOHAP-free when tested in accordance with 4.7.3.2.

3.4 Quantitative requirements.

3.4.1 Component A (epoxy resin component). Component A shall conform to the quantitative requirements of table II when tested as in section 4.

TABLE II. Component A requirements.

Characteristics	Type II		Type III / IV	
	Min	Max	Min	Max
Total solids, percent by weight	70.0	-	70.0	-
Pigment, percent by weight	41.0	-	45.0	-
Vehicle solids, percent by weight	19.0	-	18.0	-
Epoxy resin, percent by weight of vehicle solids	80.0	-	80.0	-
Fineness of grind	5.0	-	5.0	-
Viscosity, Stormer Type, shearing rate - 200 rpm equivalent, Krebs Unit (KU)	65.0	80.0	63.0	80.0

3.4.2 Component B (catalyst component). Component B shall conform to the quantitative requirements of table III when tested as in section 4.

3.4.3 Mixed primer. The mixed primer shall conform to the quantitative requirements of table IV when tested as in section 4.

TABLE III. Component B requirements.

Characteristics	Type II / III / IV	
	Min	Max
Epoxy resin	Positive (for type II only)	
Weight/gallon, pounds	7.1	10.0

3.5 Qualitative requirements.

3.5.1 Condition in container.

3.5.1.1 Component A. When tested as specified in 4.10.1, component A shall be free from grit, seeds, skins, abnormal thickening or livering in a freshly opened container and shall show no more pigment settling or caking than can be easily and completely reincorporated to a smooth homogeneous state.

3.5.1.2 Component B. When tested as specified in 4.10.2, component B shall be clear and free from sediment and suspended matter when examined by transmitted light. It shall show no livering, curdling, gelling or skinning in a freshly opened full container.

TABLE IV. Mixed primer requirements.

Characteristics	Type II		Type III / IV	
	Min	Max	Min	Max
Specular gloss, 60 degrees	10	30	10	45
Drying time:				
Set to touch, minutes	-	30	-	60
Dry hard, hours	-	4	-	5
Dry through, hours	-	6	-	8
Lead metal, % by weight of total solids	-	0.06	-	0.06
Pigment: antimony, arsenic, beryllium, cadmium, cobalt, chromium, cyanide, lead, manganese, mercury, nickel, and selenium	absent		absent	

3.5.2 Storage stability.

3.5.2.1 Component A. A full quart can of component A shall show no skinning, livering, curdling, hard dry caking or tough gummy sediment when tested as specified in 4.11.1. It shall remix readily to a smooth homogeneous state, with no more than a ten (10) KU increase in viscosity, and shall meet all other requirements of the specification.

3.5.2.2 Component B. When tested as specified in 4.11.2, a full 8 ounce can of component B shall be clear and free from sediment and suspended matter when examined by transmitted light and shall be identical in appearance to the original sample. It shall show no livering, curdling, gelling, or skinning in a freshly opened container and shall meet all other requirements of the specification.

3.5.3 Mixing properties. When tested as specified in 4.12, smooth homogeneous mixture shall result. The primer shall be free from grit, seeds, skins, or lumps. After aging as specified in 4.12, the primer shall show no signs of gelation.

3.5.4 Spraying properties. When tested as specified in 4.13, the primer shall spray satisfactorily in all respects and shall show no running, sagging, or streaking. The dried film shall show no dusting, mottling, or color separation and shall present a smooth finish free from seeds.

3.5.5 Adhesion. The assessment of the adhesion of the coating film shall be determined by its ability to not peel from the substrate when tested in accordance with ASTM D3359, as specified in 4.14. The resultant test rating shall be classified as scale 4B or better.

3.5.6 Flexibility. A film of primer, tested as specified in 4.15, shall withstand bending without cracking or flaking.

3.5.7 Water resistance. A film of primer, tested as specified in 4.16, shall show no wrinkling or blistering immediately after removal of the panel from the water. The primer shall be no more than slightly affected when examined 2 hours after removal. After 24 hours air drying, the portion of the panel which was immersed shall be the same with regard to hardness, adhesion, color and gloss as compared to the portion which was not immersed. Film softening shall not exceed a number 2 pencil hardness difference (see ASTM D3363) from an unexposed film with identical cure history prior to water exposure.

3.5.8 Hydrocarbon fluid resistance. A film of primer, tested as specified in 4.17, shall show no blistering or wrinkling and no more than a slight yellow to beige color change on submerged area of panel. Upon removal from the fluid slight softening is acceptable. After 2 hours air drying, the panel that was immersed shall be almost indistinguishable with regard to hardness, adhesion, color and gloss from a panel prepared at the same time but not immersed. Film softening shall not exceed a number 2 pencil hardness difference (see ASTM D3363) from an unexposed film with identical cure history prior to hydrocarbon fluid exposure.

3.5.9 Corrosion resistance.

3.5.9.1 Salt spray resistance. A film of primer tested as specified in 4.18.1 and examined immediately after removal from the salt spray test shall show no more than a trace of rusting (ASTM D610, table I, rust grade 9) or corrosion, and no more than five scattered blisters, none larger than one (1) mm in diameter for unscribed regions. Scribed areas for type IV primers shall have ratings as specified in ASTM D1654 method A of not less than six (6) for steel or eight (8) for aluminum panels. Upon removal of the primer, there shall be no more than a trace of rusting, pitting, or corrosion on the panels.

3.5.9.2 Cyclic corrosion test. A film of type IV primer tested as specified in 4.18.2 and evaluated using ASTM D1654 method A shall have a rating of not less than seven (7). There shall be no more than five (5) scattered blisters in the unscribed areas, none larger than one (1) mm in diameter.

3.5.10 Topcoating. A film of primer, tested as specified in 4.19, shall show no blistering, wrinkling or other evidence of lifting. The topcoat shall be difficult to remove from the primer and the primer from the panel when cut with the knife blade.

3.5.11 Weather resistance. A film of the primer, exposed as specified in 4.20, shall show no rusting, cracking, checking, flaking, or loss of adhesion. On removal of the coating system, the surface of the metal shall show no more than a trace of rusting, pitting, or corrosion (see ASTM D610, table I, rust grade 9).

3.5.12 Super tropical bleach (STB) resistance. When tested as specified in 4.21, a film of the coating shall show no blistering, wrinkling, or film softening when examined immediately after washing with water. Film softening shall not exceed a number 2 pencil hardness difference (see ASTM D3363) from an unexposed film. After drying, there shall be a maximum Delta (Δ) E color change of 2.5 L*A*B* units when comparing a portion of the untested panel to that of the tested area. The STB composition shall be in accordance with MIL-DTL-12468.

3.5.13 Toxic ingredients. Other than parachlorobenzotrifluoride (PCBTF), the primer shall contain no benzene (benzol), chlorinated solvents, or ethylene based glycol ethers and their acetates (see 4.22). The paint shall have no adverse effects on the health of personnel when used for its intended purpose.

3.6 User instruction markings. All primary containers shall be legibly marked or labeled "Component A (epoxy resin component)" or "Component B (catalyst component)" as applicable, with the manufacturer's mixing and thinning instructions, the VOC content (in lbs/gal or g/l), HAP content and the following:

PRECAUTION: The Surgeon General requires airline respirators to be used unless air sampling shows exposure to be below standards. Then, either chemical cartridge respirators or airline respirators are required. Avoid contact with skin and eyes. Use with adequate ventilation. For other safety recommendations refer to the Material Safety Data Sheet (MSDS). Keep containers closed.

INSTRUCTIONS FOR USE: Mix component A well; then add 1 part by volume of component B to 4 parts by volume of component A and mix well. If thinning is required for spray application, for type II primer, consult with the manufacturer of the primer for the appropriate thinner to stay within the regulatory limits. For thinning the type III or IV primers, follow the manufacturer's instructions. The solvents used shall be HAP-free material and stay within the regulatory VOC limits. The admixed coating may require a 30 minute induction time before use. Follow the manufacturer's recommendations. During spray application, avoid inhalation and eye or skin contact.

TYPE II, III AND IV MATERIALS HAVE A POTLIFE OF UP TO 4 HOURS AFTER MIXING THE COMPONENTS.

3.7 MSDS. A MSDS shall be prepared for the primer in accordance with FED-STD-313 and forwarded to the qualifying activity (see 6.4.3). The MSDS shall be included with each shipment of the material covered by this specification and submitted to pertinent Government agencies as stated in a FED-STD-313.

3.8 Toxicity clearance. All new chemicals and materials being added to the Army supply system shall have a toxicity clearance. A toxicity clearance involves a toxicological evaluation of materials prior to introduction into the Army supply system. The Army program manager shall be responsible for identifying technically feasible materials and requesting a toxicity clearance for use of that material within their program (see 6.6).

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 shall be conducted by the qualifying activity (see 6.4). The qualification test sample shall consist of five (5) quart kits of each material. The samples shall be legibly identified (see 6.4.4). Qualification inspection shall consist of tests for all requirements specified in section 3 and table V. Qualification inspection shall examine for user instruction markings (see 3.6). The results of each test shall be compared with the applicable requirement in section 3. Failure to conform to any requirement shall be counted as a defect and paint represented by the sample test shall not be approved for inclusion in the QPD under this specification. Conditional approval shall be given until completion of the weathering test. Upon completion of this test, then final approval shall be given.

4.3 Conformance inspection. The manufacturer shall forward from each production lot (see 4.3.1) a batch validation letter detailing the batch number, manufacturer's code, specification and type number, QPL number and batch volume to U.S. Army Research Laboratory (ARL), ATTN: RDRL-WMM-C, Organic Coatings Team, Building 4600, Deer Creek Loop, Aberdeen Proving Ground (APG), MD 21005-5066. The manufacturer shall perform conformance inspection testing on each production lot and have these test results on file when requested by the contracting officer. Conformance inspection for individual lots shall test for VOC, condition in container, total solids, fineness of grind, mixing properties, spraying properties, drying time, and 60 degree specular gloss. There shall be no failures (see 6.5).

4.3.1 Lot and batch formation. Unless otherwise specified in the contract or purchase description (see 6.2), a lot shall consist of all coatings of the same type, composition and color, from a single uniform batch, produced and offered for delivery at one time (see 6.4.2). Unless otherwise specified in the contract or purchase description (see 6.2), a batch shall consist of all coating material (in U.S. gallons) manufactured during one continuous operation and forming part of one contract or order for delivery (see 6.4.2). The addition of any substance to a batch shall constitute a new lot.

4.4 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with ASTM D3924. Also, unless otherwise stated in the test method or paragraph, room temperature shall be 73 ± 4 °F (23 ± 2 °C) and a 40 - 70 percent relative humidity.

4.5 MSDS. The MSDS shall address components A and B and be in compliance with FED-STD-313. Noncompliance to 3.7 shall be cause for rejection.

4.6 Test methods.

4.6.1 Test conditions. Except as otherwise specified herein, the routine testing and referee testing shall be conducted in accordance with ASTM D3924. A dry film thickness of 1.5 ± 0.2 mils (37.5 ± 5 microns) shall be used whenever film thickness is requested in any test, unless otherwise required by the test. Failure of any test result to fall within the specified ranges in section 3 shall constitute failure of the applicable test. For all tests requiring the use of the mixed primer, components A and B shall be mixed in the proportions specified in paragraph 4.12.

4.6.2 Test panels. Steel test panels shall be cold-rolled SAE 1010 steel conforming to ASTM A109/A109M or ASTM A1008/A1008M, treated with a zinc phosphate coating in accordance with TT-C-490, type I. The panels shall have a Rockwell B hardness of 55 to 75 and a surface roughness of 30 to 45 micro inches (arithmetic average) as rolled. Aluminum test panels shall be aluminum alloy 2024-T3 treated with MIL-DTL-5541, type II.

4.6.3 Test procedures. Tests (see table V) shall be conducted in accordance with ASTM, GM, EPA or as specified herein. The right is reserved to make any additional tests deemed necessary to determine that the primer meets the requirements of this specification.

TABLE V. Index.

Item	ASTM Test Method	Test Paragraph	Requirement Paragraph or Table
Pigment analysis	D2371	4.7.1	3.3.1; Table I
Titanium dioxide	D1394	4.7.1.1	Table I
Zinc phosphate	-	4.7.1.2	Table I
Hexavalent chromium	-	4.7.1.3	-
Nonvolatile content	D7232	4.7.2	Table II
Isolation of vehicle (Supercentrifuge)	D2698	-	3.3.2
VOC	D3960	4.7.3.1	3.3.2.3.1 & 3.3.2.3.2
VOHAP 1/	D3271	4.7.3.2	3.3.2.3.3
Pigment solids	D2371	-	Table II
Vehicle solids	D2371	-	Table II
Viscosity	D562	-	Table II
Fineness of grind	D1210	-	Table II
Epoxy resin component A component B	 D1652 -	 4.7.4.1 4.7.4.2	 Table II Table III
Weight/gallon component B	 D1475	 4.7.4.3	 Table III
Lead metal	D3335	4.7.5	Table IV
60° specular gloss	D523	4.8	Table IV
Drying time	D5895	4.9	Table IV

TABLE V. Index - Continued.

Item	ASTM Test Method	Test Paragraph	Requirement Paragraph or Table
Condition in container component A component B	 - -	 4.10.1 4.10.2	 3.5.1.1 3.5.1.2
Storage stability Full container component A component B	 D1849 -	 4.11.1 4.11.2	 3.5.2.1 3.5.2.2
Mixing properties	-	4.12	3.5.3
Spraying properties	-	4.13	3.5.4
Adhesion	D3359	4.14	3.5.5
Flexibility	D522 method B	4.15	3.5.6
Water resistance	D1308	4.16	3.5.7
Hydrocarbon resistance	-	4.17	3.5.8
Salt spray resistance	B117	4.18.1	3.5.9.1
Cyclic corrosion resistance 2/	-	4.18.2	3.5.9.2
Topcoating	-	4.19	3.5.10
Weather resistance	G90	4.20	3.5.11
STB resistance	-	4.21	3.5.12
Toxic ingredients	-	4.22	3.5.13

1/ EPA Method 311.
2/ General Motors Standard: GMW 14872.

4.7 Analysis of primer.

4.7.1 Pigment analysis. Extract the pigment as in ASTM D2371, but use ethanol for the extraction. Make appropriate qualitative and quantitative tests on the extracted pigment to determine if only permissible pigments were used. Nonconformance to 3.3.1 shall constitute failure of this test.

4.7.1.1 Titanium dioxide (TiO_2) content. Determine the titanium dioxide (TiO_2) content on the extracted pigment in accordance with ASTM D1394 for compliance with table I. Nonconformance to table I shall constitute failure of this test.

4.7.1.2 Zinc phosphate content. Determine the zinc phosphate content in accordance with 4.7.1.2.1 and 4.7.1.2.2.

4.7.1.2.1 Determination of zinc.

4.7.1.2.1.1 Reagents.

a. Buffer solution (pH 10): 350 ml concentrated NH_4OH + 54 g NH_4Cl + H_2O to give 1000 ml.
b. Eriochrome black T (0.5%): 0.25 g eriochrome black T + 2.2 g hydroxylamine hydrochloride/50 ml methanol solution.
c. Primary standard zinc oxide (0.200N): Accurately weigh 4.069 g of oven dried ZnO. Dissolve it in 250 ml of the buffer solution and dilute to 500 ml.
d. 0.5N Disodium ethylenediaminetetraacetate dehydrate (EDTA): 37.2 g EDTA/liter aqueous solution.

4.7.1.2.1.2 Procedure.

a. Accurately weigh approximately 1.0 g of pigment into a 250 ml glass stoppered Erlenmeyer flask.
b. Add 25 ml buffer, stopper, and shake vigorously every few minutes over a period of 30 minutes.
c. Filter through fine paper into a 400 ml beaker, washing well with water until 200 ml of filtrate are collected.
d. Add 20.0 ml of the EDTA (an excess) to the filtrate.
e. Add 10 drops of eriochrome black T.
f. Titrate with standard ZnO to a wine-red end point (Vs).
g. Run a blank by titrating 20.0 ml of the EDTA in 200 ml of an aqueous solution containing 25 ml of the buffer (V_b).

4.7.1.2.1.3 Calculations.

$$\text{Percent zinc} = \frac{(V_b - V_S) \times 0.02 \times 3.269}{\text{Sample weight}}$$

$$\text{Percent zinc phosphate} = \frac{(V_b - V_S) \times 0.2 \times 7.035}{\text{Sample weight}}$$

4.7.1.2.2 Determination of phosphate.

4.7.1.2.2.1 Reagents.

a. Concentrated NH_4OH.
b. Concentrated HNO_3.
c. NH_4NO_3.
d. Ammonium molybdate - Johnson's formula: Mix 55 g of $(NH_4)_6MO_7O_{24} \cdot 4H_2O$ and 50 g of NH_4NO_3 with 18 ml of concentrated NH_4OH and 20 ml H_2O. Stir. Dilute to about 700 ml with H_2O. Heat with occasional stirring until all salts have dissolved. Dilute to 1000 ml. Let stand overnight. Filter through fine paper but do not wash the residue.

4.7.1.2.2.2 Procedure.

a. Accurately weigh approximately 2 g of pigment into a 250 ml glass stoppered Erlenmeyer flask.
b. Add 30 ml 7.5N HNO_3 and agitate the sample every few minutes over a period of 30 minutes.
c. Filter through Whatman 50 paper into a 400 ml beaker washing well with water.
d. Add 6 g of NH_4NO_3, stir.
e. Heat the clear solution to 80 °C (no higher) and add 75 ml of ammonium molybdate with constant stirring.
f. Stir for several minutes and let the precipitate settle for 2 hours.
g. Filter through a tared crucible (gooch or medium glass), transfer the precipitate and wash with 1 percent HNO_3 5 ml concentrated HNO_3/500 ml solution. The washing shall be thorough.
h. Give the collected precipitate a final wash with a small amount of water.
i. Dry the crucible for 2 hours in a 105 °C oven.
j. Cool crucible in a desiccator and determine the weight of the precipitate (it shall not exceed 3 g; if it does, repeat the determination with a smaller sample).

4.7.1.2.2.3 Calculations.

$$\text{Percent phosphate } [PO_4] = \frac{\text{Weight of precipitate x 5.029}}{\text{Sample weight}}$$

$$\text{Percent zinc phosphate } [Zn_3(PO_4)_2 \cdot 2H_2O] = \frac{\text{Weight of precipitate x 11.18}}{\text{Sample weight}}$$

4.7.1.2.2.4 Failure criteria. Nonconformance to table I shall constitute failure of this test.

4.7.1.3 Hexavalent chromium. Determine the presence or absence of hexavalent chromium by either of the following chemical reagent screening techniques.

(a) Weigh approximately 250 mg of pigment into a small glass test tube. Add 5 ml of 25 percent aqueous KOH and shake vigorously for 1 - 2 minutes. Decant a one ml aliquot into a plastic micro-centrifuge tube and centrifuge for five (5) minutes at 17,000 rpm, balancing the centrifuge with a tube containing one ml of the KOH solution. The resulting supernatant liquid shall be nearly colorless. Use the tube containing the KOH solution as a reference. A distinct yellow color indicates the presence of hexavalent chromium and therefore shall constitute failure of the test requirement.

(b) Weigh approximately 50 mg of pigment into a small glass test tube. Add 5ml of 10 percent aqueous H_2SO_4 and shake vigorously for 1 - 2 minutes. Decant a one ml aliquot into a plastic micro-centrifuge tube and centrifuge for five (5) minutes at 17,000 rpm, balancing the centrifuge with a second tube containing one ml of the H_2SO_4 solution. The solution in the second tube shall act as the test "blank". Immerse a chromate ion (CrO_4^{2-}) test strip into the supernatant from each tube. Shake off the excess liquid and after approximately one minute compare the color change in the reaction zone of the strips to the color scale (concentration levels) provided by the manufacturer. The appearance of a purple/violet color from the "sample"

strip is indicative of hexavalent chrome and therefore shall constitute failure of the test requirement. If a color change is apparent from the "blank" strip rerun the test using fresh, chromium-free reagents. The appearance of a pronounced color change is indicative of hexavalent chrome and therefore shall constitute failure of the test requirement.

4.7.2 Nonvolatile (total solids) content. Place a portion of the thoroughly mixed sample in a dropping bottle and weigh to the nearest one-tenth mg. Weigh one 60 mm aluminum dish to the nearest one-tenth mg. Transfer a small sample that does not exceed 0.3 g to the dish, determine its exact weight to the nearest one-tenth mg by loss in weight of the bottle. Dissolve the sample in 2 ml of A.C.S. reagent grade ethanol and dry in a gravity convection oven at 221 ^{o}F (105 ^{o}C) for one (1) hour. Upon cooling, reweigh the dish to the nearest one-tenth mg. From the weight of the residue in the dish and the weight of the sample taken, calculate the percent nonvolatile (total solid) as required. Nonconformance to the requirements in table II shall constitute failure of this test.

4.7.3 Solvent analysis.

4.7.3.1 VOC determination. For type II, III and IV, determine the VOC of component A and component B in accordance with ASTM D3960. The density is determined by using the weight/gallon cup described in ASTM D1475. The nonvolatile content is determined by using ASTM D7232. The notarized statement of composition shall be used in the determination process. Calculate the VOC for the coating as mixed with the equation:

$$\frac{4(\text{VOC of component A}) + (\text{VOC of component B})}{5} = \text{VOC lbs/gal of mixed coating}$$

Determine compliance with 3.3.2.3.1 for type II and 3.3.2.3.2 for type III and IV.

4.7.3.2 Solvent VOHAP determination. Hazardous solvent content of each individual coating shall be determined in accordance with ASTM D3271 or EPA Method 311, as applicable. Check for compliance with 3.3.2.3.3.

4.7.4 Analysis of vehicle.

4.7.4.1 Epoxy resin - component A. Determine the epoxy resin content on the extracted vehicle in accordance with ASTM D1652 for compliance with table II. Nonconformance to table II constitutes failure of this test.

4.7.4.2 Epoxy resin - component B. Place 4 drops of component B in a test tube. Add about 10 drops of toluene and 10 drops of ethyl alcohol, mix and dry completely in an oven at 105 °C (221 °F). After cooling, add 1 ml concentrated sulfuric acid and warm to about 60 °C (140 °F) in a water bath for 10 minutes. Cool and add 2 drops of 40 percent formaldehyde solution. Allow the sample to stand a few minutes. Dilute with 10 ml of water added all at one time. A blue or green color shall form almost immediately if epoxy resins of the bisphenol type are present. Nonconformance to table III constitutes failure of this test.

4.7.4.3 Weight/gallon - component B. Determine the weight/gallon of component B in accordance with ASTM D1475 and check for compliance with table III. Nonconformance to table III constitutes failure of this test.

4.7.5 Lead content. Determine the presence or absence of lead by weighing 50 mg of pigment into a small glass test tube. Add 5 ml of dilute HNO_3 and shake vigorously for 1-2 minutes. Decant a one ml aliquot into a plastic micro-centrifuge tube and centrifuge for five (5) minutes at 17000 rpm - balancing the centrifuge with a tube containing one ml of the dilute HNO_3 solution. This tube shall also act as the test "blank". Immerse a lead test strip into the supernatant from each tube. Shake off the excess liquid and after approximately one minute compare the color change in the reaction zone of the strips to the color scale (concentration levels) provided by the manufacturer. If any color change is apparent from the "blank" strip rerun the test using fresh, lead-free reagents. For the "Sample" strip, the appearance of a bright red color is indicative of lead at a concentration level above the specification limit, while no color change or a faint pink color change is indicative of lead concentrations below the specification limit. Confirmation of the exact lead concentration in the coating's solids shall be determined using any authoritative quantitative method, such as ASTM D3335.

4.8 Specular gloss (60 degree). Prepare a film of the primer on steel as specified in 4.13 and allow to dry 48 hours. Determine the 60 degree specular gloss in accordance with ASTM D523. Nonconformance to table IV shall constitute failure of this test.

4.9 Drying time. Spray the mixed coating on a test panel as specified in 4.13 to a dry film thickness of 1.5 ± 0.2 mils (37.5 ± 5 microns). Determine the drying time under ambient conditions in accordance with ASTM D5895. Check for compliance with table IV.

4.10 Condition in container.

4.10.1 Component A. Upon opening a full previously unopened container, the condition of the contents shall be examined for compliance with 3.5.1.1. Reseal, then agitate the container for three (3) minutes on a paint shaker and examine for compliance with 3.5.1.1. On reexamination of the contents, the disclosure of any gel bodies or undispersed pigment indicates unsatisfactory settling properties.

4.10.2 Component B. Upon opening a full previously unopened container, the condition of the contents shall be examined for compliance with 3.5.1.2.

4.11 Storage stability.

4.11.1 Component A. Allow a full quart can of component A to stand undisturbed for one (1) year in accordance with ASTM D1849 and then examine the contents. Evaluate the pigment settling as specified in 4.10.1, except agitate the can for five (5) minutes on a paint shaker prior to reexamination. Determine viscosity and other applicable tests for compliance with 3.5.2.1.

4.11.2 Component B. Allow a full 8 ounce can of component B to stand for one (1) year under standard laboratory conditions. At the end of this period, examine the contents for compliance to 3.5.2.2.

4.12 Mixing properties. Thoroughly mix 4 parts by volume of component A with one part by volume of component B and examine for compliance with 3.5.3. Place 5 ounces of the material in an eight ounce glass jar and do not agitate or disturb for 4 hours. At the end of this period examine for compliance with 3.5.3.

4.13 Spraying properties. If necessary for application of type II primer, use the solvent MIL-T-81772, type I or II if necessary or follow the manufacturer's recommendations not to exceed the VOC level (see 1.2). For type III and IV primer, follow the manufacturer's recommendations not to exceed the VOC level (see 1.2). To maintain a HAP-free primer, MIL-T-81772 shall not be used with the type III or IV material. Spray primer on a steel panel to a dry film thickness of 1.5 ± 0.2 mils (37.5 ± 5 microns). The coating properties of the dry sprayed surface shall be observed for compliance with 3.5.4.

4.14 Adhesion. Spray the primer as in 4.13 on a steel and aluminum panel pretreated as in 4.6.2. Air dry types II, III and IV specimens for seven (7) days. Perform adhesion testing as specified in ASTM D3359, method B and examine for compliance with 3.5.5.

4.15 Flexibility. Determine flexibility in accordance with ASTM D522, method B. Spray the coating on a steel panel, tinplated 0.010 inches (0.254 mm) thick to a dry film thickness of 1.5 ± 0.2 mils (37.5 ± 5 microns). Air dry for 168 hours. Bend the coated panels over a ¼ inch mandrel. Examine the coating for cracks over the area of the bend for compliance with 3.5.6.

4.16 Water resistance. Prepare sprayed films of primer as in 4.13 on test panels pretreated as in 4.6.2. Allow the panels to air dry seven (7) days. Coat all exposed, uncoated metal surfaces with wax or other suitable coating. Immerse the panels for 168 hours in distilled water at 73 ± 2 °F (23 ± 1 °C) as specified in ASTM D1308. On removal, observe panels for compliance with 3.5.7. Nonconformance to 3.5.7 constitutes failure of this test.

4.17 Hydrocarbon fluid resistance. Prepare films of primer as in 4.13 on test panels pretreated as in 4.6.2 and air dry seven (7) days. Do not wax or coat the exposed metal surfaces. Immerse the panels for 168 hours in a hydrocarbon fluid conforming to JP8 at 70 ± 5 °F (21 ± 3 °C). Panels shall be immersed at a minimum depth of 50 %. At the end of the test period, remove and examine for compliance with 3.5.8. Nonconformance to 3.5.8 shall constitute failure of this test.

4.18 Corrosion testing. For types II and III, prepare three (3) 4 by 12 inch test panels each as in 4.14 and air dry for seven (7) days. For type IV, prepare ten (10) pretreated steel and five (5) aluminum 3 x 6 inch panels as specified in 4.14. For the type IV primer, five (5) each of the steel prepared panels shall be exposed to the salt spray resistance and cyclic corrosion resistance. Allow to air dry for seven (7) days. Coat the edges and uncoated metal surfaces with wax or other suitable coating.

4.18.1 Salt spray resistance. Expose the panels prepared in 4.18 to 5 percent salt spray for 336 hours for types II and III in accordance with ASTM B117. For type IV, take five (5) of the steel panels and the five (5) aluminum panels from 4.18 and make an "X" scribe through the primer. Expose these scribed panels for 1,000 hours in accordance with ASTM B117. Upon removal, wash the panel's gently in warm running water until free from any visible salt deposits and examine immediately for compliance with 3.5.9.1. Nonconformance to 3.5.9.1 shall constitute failure of this test.

4.18.2 Cyclic corrosion resistance. Take remaining five (5) steel panels from 4.18 and make an "X" scribe through the primer. Expose the panels to accelerated cyclic corrosion for 40 cycles for type IV in accordance with GMW 14872. Upon removal, rinse panels until visible salt deposits are removed. Examine immediately for compliance with 3.5.9.2. Strip primer with

suitable paint remover and inspect for rust, pitting or corrosion not evident with paint present. Nonconformance to 3.5.9.2 shall constitute failure of this test.

4.19 Topcoating. Prepare two (2) test panels for each topcoat as in 4.16. Allow primer to air dry 1 hour and 24 hours respectively and spray a coat of Green 383, color 34094 conforming to MIL-DTL-64159 and MIL-DTL-53039 over the specimens. If necessary, the topcoats shall be thinned according to the specification, with thinner conforming to the specification or manufacturer, and sprayed to a dry film thickness of 2 ± 0.2 mils (50 ± 5 microns). Visually examine the panels for evidence of lifting after the topcoat has air dried 2 hours. Allow the specimens to air dry 168 hours after topcoat application. Perform adhesion testing as specified in ASTM D3359, method B and examine its ability to resist peeling. The resultant rating shall be classified as scale 4B or better. Nonconformance to 3.5.10 constitutes failure of this test.

4.20 Weather resistance. Prepare four (4) 4 by 12 inch panels (2 of each substrate) of the primer as in 4.13 and pretreated as in 4.6.2. Allow the primer to air dry for 24 hours and then apply a coat of Green 383, color 34094 as specified in MIL-DTL-64159 type II to a dry film thickness of 2 ± 0.2 mils (50 ± 5 microns). Allow to air dry for a minimum of seven (7) days and record color and 60° gloss readings for each panel. Panels shall be placed outdoors, for the equivalent of 560 MJ/m^2 of total UV irradiance, in an accelerated outdoor exposure according to ASTM G90. At 70 MJ/m^2 intervals examine the panels for compliance with 3.5.11. Determine chalking according to ASTM D4214. Rinse the panels with a warm soap solution using a soft sponge or cloth, rinse, dry and examine for color change at each interval. The exposure racks shall be weathered at latitude 33° 23’ north and 112° 35’ west. Nonconformance to 3.5.11 shall constitute failure of this test.

4.21 Super tropical bleach (STB) resistance. Prepare a steel panel as specified in 4.15. Scribe a one (1) inch diameter wax ring using a china marker on the painted surface of the panel. Place approximately one (1) ml of STB agent on the panel surface. Do not cover. Allow to stand 30 minutes then thoroughly wash with water. A STB slurry mix of 40 parts STB and 60 parts water by weight shall be used. Examine for compliance with 3.5.12.

4.22 Toxic ingredients. Other than PCBTF, the manufacturer shall certify that the primer contains no benzene (benzol), chlorinated solvents or ethylene based glycol ethers and their acetates. Nonconformance to 3.5.13 constitutes failure of this requirement.

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 command. 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 that may be helpful, but is not mandatory.)

6.1 Intended use. The primer described in this specification, which is lead and hexavalent chromium free, is intended for use on clean, chemically pretreated surfaces in camouflage systems. Type II formulations will meet a 420 g/l (3.5 lbs/gal) maximum VOC content requirement. Type III and IV formulations will meet a 340 g/l (2.8 lbs/gal) maximum VOC content requirement and be HAP-free. Type IV will also provide enhanced corrosion performance of 1,000 hours salt spray and 40 cycles on the cyclic corrosion test. This epoxy primer should not be used on aircraft or any associated components of the aircraft. The proper aircraft primers are either MIL-PRF-23377 or MIL-PRF-85582.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification.
b. Type of coating required (see 1.2).
c. Part or identifying number (PIN) (see 1.2.1).
d. Color required (see 3.2).
e. Size of primary container required for component A and size of primary container required for component B (see 3.3).
f. Whether a MSDS is required with each shipment (see 3.7 and 4.5).
g. If a toxicity clearance is required (see 3.8).
h. If qualification samples are required and where to send them (see 4.2 and 6.4).
i. If conformance samples are required and where to send them (see 4.3).
j. Lot and batch formation (see 4.3.1).
k. Packaging requirements (see 5.1).

6.3 Basis of purchase. The primers covered by this specification should be purchased by volume, the unit being a kit comprised of 1 quart of 57.75 cubic inches or 1 gallon of 231 cubic inches. The kit components need not be the same size.

6.4 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 the QPD, whether or not such products have actually been so listed by that date. The attention of contractors is called to this requirement 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. Samples for QPD testing (see 4.2) should be submitted to ARL, ATTN: RDRL-WMM-C, Organic Coatings Team, Building 4600, Deer Creek Loop, APG, MD 21005-5066.

6.4.1 Retention of qualification. In order to retain qualification of a product approved for listing in the QPD, the manufacturer will verify by certification to the qualifying activity that the manufacturer's product complies with the requirements of this specification. Unless otherwise specified, the time of periodic verification by certification will be in two year intervals from the date of the original qualification, and will be initiated by the qualifying activity. No change will be made in formulation, raw materials or supplier(s) of raw materials, methods of manufacture,

equipment, or geographic location without prior written Government approval. The Government reserves the right to re-examine the qualified product whenever deemed necessary to determine that the product continues to meet any or all of the specification requirements.

6.4.2 Conformity to qualified sample. All lots of coatings supplied under this specification must be manufactured using the same formulation, raw materials and supplier(s) of raw materials, methods of manufacture, equipment, and geographic location as the qualification sample, unless changes have been approved by the qualifying activity.

6.4.3 MSDS. Contracting officers will identify those activities requiring copies of a completed MSDS prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in FED-STD-313.

6.4.4 Sample identification for qualification inspection. Samples for QPD testing are to be identified in a cover letter with the following information:

Manufacturer's name and product number.
Submitted by (name and date).
Specify the number of samples.
Specify the reason for submitting the samples.
Specification MIL-DTL-53022E; Type_____, Color_____,
"Primer, Epoxy Coating, Corrosion Inhibiting Lead And Chromate Free".
Provide a copy of the MSDS.
Provide a copy of the notarized statement of composition.
Provide a copy of the technical data sheet.
Provide a copy of the test report.

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 justification for removal from the qualified products list. Rejected material cannot be resubmitted for acceptance without written approval from the qualification activity (see 4.3). The application for resubmission will contain all details concerning previous rejections and measures taken to correct these deficiencies.

6.6 Toxicity request. Department of the Army Regulation (AR) 40-5, Preventive Medicine, (AR) 70-1, Acquisition Policy, and Department of the Army Pamphlet 70-3, Acquisition Procedures, require a toxicity clearance. Army toxicity questions and/or a toxicity clearance request should be addressed to: Commander, US Army Center For Health Promotion and Preventive Medicine, ATTN: MCHB-TS-TTE, 5158 Blackhawk Road, APG, MD 21010-5403.

6.7 Detail specification. MIL-DTL-53072, Chemical Agent Resistant Coating (CARC) System Application Procedures and Quality Control Inspection, is available for application procedures and quality control inspection of this coating.

6.8 Subject term (key word) listing.

Aluminum
Camouflage system
HAP
Metal
Panels
Steel
VOC

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

CONCLUDING MATERIAL

Custodians:
Army - MR
Navy - AS
Air Force - 11

Review activities:
Army - MD1, MI
Navy - CG, SH, MC
Air Force - 84, 99

Civil agency:
GSA/FAS

Preparing activity:
Army - MR

Project: 8010-2012-001

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://assist.daps.dla.mil/.