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SUPERSEDING
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MILITARY 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 metals. The primer is lead and chromate free and meets the air pollution requirements for solvent emissions (see 1.2 and 6.1).

1.2 Types. The coating shall be furnished in the following types as specified (see 6.2):

Type I - Lead and chromate free formulation to meet Rule 102, South Coast Air Quality Management District (see 3.3.2.3.1).
Type II - High solids, lead and chromate free formulation to meet a maximum volatile organic compound (VOC) content of 420 grams/liter (3.5 pounds/gallon) as packaged (see 4.9).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATIN: STRBE-TSE, Fort Belvoir, VA 22060-5606 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 8010

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

QQ-A-250/5	- Aluminum Alloy Alclad 2024, Plate and Sheet.
TT-C-490	- Cleaning Methods and Pretreatment of Ferrous Surfaces.
TT-S-735	- Standard Test Fluids, Hydrocarbons.
PPP-B-601	- Boxes, Wood, Cleated Plywood.
PPP-B-621	- Box, Wood, Nailed and Lock-Corner.
PPP-B-636	- Boxes, Shipping, Fiberboard.
PPP-C-96	- Can, Metal, 28 Gage and Lighter.
PPP-P-704	- Pail, Metal (Shipping, Steel, 1 Through 12 Gallon).
PPP-P-1892	- Paint, Varnish, Lacquer and Related Materials; Packaging, Packing and Marking of.
PPP-T-60	- Tape, Packaging, Waterproof.

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MIL-C-5541	- Chemical Conversion Coatings on Aluminum and Aluminum Alloys.
MIL-C-46168	- Coating, Aliphatic, Polyurethane, Chemical Agent Resistant.
MIL-C-53039	- Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant.
MIL-C-81706	- Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys.
MIL-T-81772	- Thinner, Aircraft Coatings.

STANDARDS

FEDERAL

FED-STD-141	- Paint, Varnish, Lacquer, and Related Materials, Methods of Inspection, Sampling and Testing.
FED-STD-313	- Preparation and Submission of Material Safety Data Sheet.
FED-STD-595	- Colors.

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MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-45662	-	Calibration Systems Requirements.

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

DEPARTMENT OF TRANSPORTATION (DOT)

49 CFR, 171-178 - Hazardous Materials Regulations.

(Applications for copies should be addressed to Superintendent of Documents, Government Printing Office, Washington, DC 20402).

(Copies of specifications, standards, handbooks, drawings, publications, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the non-Government documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

B 117	-	Salt Spray Testing.
D 523	-	Specular Gloss, Standard Test Method for.
D 562	-	Tests of Viscosity of Paints using Stormer Viscosimeter.
D 610	-	Evaluating Degree of Rusting on Painted Steel Surfaces.
D 1006	-	Conducting Exterior Exposure Test of Paints on Wood.
D 1210	-	Fineness of Dispersion of Pigment-Vehicle Systems.
D 1308	-	Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
D 1394	-	Chemical Analysis of White Titanium Pigments.
D 1475	-	Density of Paint, Varnish, Lacquer, and Related Products.
D 2369	-	Volatile Content of Coatings, Standard Test Method for.
D 2698	-	Determination of the Pigment Content of Solvent-Type Paints by High Speed Centrifuging.

D 3272 - Recommended Practices for Vacuum Distillation of Solvents from Solvent Based Paints for Analysis.
D 3335 - Test for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy.
D 3951 - Standard Practice for Commercial Packaging.
D 3960 - Determining Volatile Organic Content (VOC) of Paints and Related Coatings, Standard Practice for.

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

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification (NMFC)

(Application for copies should be addressed to the American Trucking Association, Inc., Traffic Department, 2200 Mill Road, Alexandria, VA 22314.)

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

Rule 102 - Photochemically Reactive Solvents.

(Application for copies should be addressed to South Coast Air Quality Management District, 9150 E. Flair Drive, El Monte, CA 91731, Attention: Business Services Officer-Rules and Regulations.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification (UFC)

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede 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 list at the time set for opening of bids (see 4.3 and 6.3). Any change in the formulation of a qualified product will 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 shall be characteristic of titanium dioxide pigment or a light grey not darker than No. 26622 of FED-STD-595.

3.3 Composition. The primer shall be furnished in 2 parts: part A (a pigmented epoxy resin component) in 1-quart, 1-gallon, 4-gallon or 5-gallon primary containers (see 5.1.1.1 and 6.2), and part B (catalyst components) in 1/2-pint, 1-quart or 1-gallon primary containers (see 5.1.1.2 and 6.2). When mixed four parts by volume of part A to one part by volume of part B, a product meeting the applicable requirements of this specification will result.

3.3.1 Pigment. The pigment portion of part A shall consist of the ingredients in the proportions by weight specified in table I. When the part A of the primer is tested in accordance with section 4, the analysis shall conform to the requirements of table II. Zinc chromate or neutral lead chromate shall not be employed alone or as a component part of any pigment. Small amounts of tinting pigments are permissible to achieve color as in 3.2. Extender pigments must be siliceous in nature, however the use of silica-alumina ceramic spheres is permitted.

Table I. Pigment composition.

Characteristics	Type I Requirements Min	Type I Requirements Max	Type II Requirements Min	Type II Requirements Max
Titanium dioxide	50.0	-	32.0	-
Zinc phosphate	9.0	11.0	5.0	-
Corrosion inhibiting pigment 1/	0.9	1.1	0.5	-
Extenders	-	40.0	-	45.00
Hexavalent chromium	negative		negative	

1/ Sicorin RZ, Basf Wyandotte Corp. or equivalent.

3.3.2 Vehicle.

3.3.2.1 Part A (epoxy resin component. Part 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 Part B (catalyst component). Part B shall consist of an aliphatic polyamine-epoxy resin adduct combined 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 of volume when tested as in table V.

3.3.2.3.1 For type I. The volatile portion of the mixed primer shall conform to Rule 102 of South Coast Air Quality Management District as described below.

a. A combination of hydrocarbons, alcohols, aldehydes, ester, ethers, and ketones having an olefinic or cyclo-olefinic type of unsaturation: 5 percent maximum.
b. A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethyl benzene: 8 percent maximum.
c. A combination of ethyl benzene, ketones having branched hydrocarbon structures, or toluene: 20 percent maximum.
d. Total a + b + c: 20 percent maximum.

3.3.2.3.2 For type II. The volatile organic compound content shall not exceed 420 grams/liter (3.5 pounds/gallon) as packaged (see 4.9).

3.4 Quantitative requirements.

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

Table II. Part A requirements.

Characteristics	Type I Min	Type I Max	Type II Min	Type II Max
Total solids, percent by weight of part A.	60	-	70	-
Pigment, percent by weight of part A.	38	-	41	-
Vehicle solids, percent by weight of part A.	22	-	19	-
Epoxy resin, percent by weight of vehicle solids.	90	-	80	-
Fineness of grind.	5	-	5	-
Viscosity, Kerbs Stormer, Shearing rate - 200 rpm. Equivalent K.U.	63	73	65	80
Coarse particles and skins (retained on a 325 standard sieve), percent by weight of pigment.	-	1.0	-	1.0

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

Table III. Part B requirements.

Characteristics	Type I Min	Type I Max	Type II Min	Type II Max
Amine nitrogen content, percent by weight of part B	2.0	3.0	3.0	4.0
Epoxy resin	Positive		Positive	
Weight per gallon, pounds	7.6	8.0	7.5	8.5

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

Table IV. Quantitative requirements.

Characteristics	Type I Min	Type I Max	Type II Min	Type II Max
Specular gloss, 60 degrees.	10	30	10	30
Dry time.				
Set to touch, minutes.	-	15	-	30
Dry hard, minutes.	-	90	-	240
Dry through, hours.	-	4	-	6
Lead metal, percent by weight of total solids.	-	0.06	-	0.06

3.5 Qualitative requirements.

3.5.1 Condition in container.

3.5.1.1 Part A. When tested as specified in 4.7.1, part 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 Part B. When tested as specified in 4.7.2, part 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.

3.5.2 Storage stability.

3.5.2.1 Part A. A full quart can of part A shall show no skinning, livering, curdling, hard dry caking or tough gummy sediment when tested as specified in 4.8.1. It shall remix readily to a smooth homogeneous state and shall meet all other requirements of the specification.

3.5.2.2 Part B. When tested as specified in 4.8.2, a full 8 ounce can of part 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 container and shall meet all other requirements of the specification.

3.5.3 Mixing properties. When tested as specified in 4.9, smooth homogeneous mixture shall result. The primer shall be free from grit, seeds, skins, or lumps. After aging as specified in 4.9, the primer shall show no signs of gelation.

3.5.4 Spraying properties. When tested as specified in 4.10, 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. A film of the primer tested as specified in 4.11 shall show no removal of the primer by the adhesive tape beyond one-sixteenth inch on either side of the score line.

3.5.6 Knife test. A film of primer, tested as specified in 4.12, shall adhere tightly to the test panel. It shall be difficult to furrow off with the knife and shall not flake, chip or powder. The knife cut shall show beveled edges.

3.5.7 Flexibility. A film of primer, tested as specified in 4.13, shall show no cracking or flaking.

3.5.8 Water resistance. A film of primer, tested as specified in 4.14, 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; and after 24 hours air drying, the portion of the panel which was immersed shall be almost indistinguishable with regard to hardness and adhesion from the portion which was not immersed.

3.5.9 Hydrocarbon fluid resistance. A film of primer, tested as specified in 4.15, 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 and gloss from a panel prepared at the same time but not immersed.

3.5.10 Salt spray resistance. A film of the primer, tested as specified in 4.16 and examined immediately after removal from the test, shall show no more than a trace of rusting (ASTM D 610, No. 9) and no more than five scattered blisters, none larger than 1 mm in diameter. On removal of the primer, there shall be no more than a trace of rusting, pitting or corrosion of the substrate.

3.5.11 Topcoating. A film of primer, tested as specified in 4.17, 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.

3.5.12 Weather resistance. A film of the primer, exposed as specified in 4.18, 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 (ASTM D 610, No. 9).

3.5.13 DS2 resistance. A film of the coating when tested as specified in 4.19 shall show no blistering or wrinkling when examined immediately after washing with water. After drying, there shall be no film softening and a maximum color change of 2.5 NBS units (see 6.8) when comparing a portion of the untested panel to that of the tested area.

3.5.14 Toxic ingredients. The primer shall contain no benzene (benzol), chlorinated solvents or ethylene based glycol ethers and their acetates.

3.6 User instruction markings. In addition to the markings specified in 5.3.1 and 5.3.2, all primary containers shall be legibly marked or labeled "Part A (epoxy resin component)" or "Part B (catalyst component)" as applicable. In addition, label the containers with appropriate information from section V and VIII of the Material Safety Data Sheet (see 3.7). Specify the emergency and first-aid procedures; and indicate the type of personal protective equipment (especially respiratory protection required) and the precautions to be taken when using the product for its intended purpose and with the following:

CAUTION:

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. For other safety instructions refer to the Material Safety Data Sheet.

INSTRUCTION FOR USE:

Mix part A well; then add 1 part by volume of part B to 4 parts by volume of part A and mix well. For spray application, type I material may be thinned by reducing 4 parts of the mixed primer by volume with one part by volume of MIL-T-81772. For spray application of type II material, follow the manufacturer's instructions in order to maintain a maximum of 420 gram/liter (3.5 pound/gallon) VOC level. After reduction, allow a 20 minute induction time before use. During spray application, avoid inhalation and eye or skin contact.

TYPE I MATERIAL SHOULD BE USED WITHIN 8 HOURS AFTER MIXING, TYPE II MATERIAL SHOULD BE USED WITHIN 4 - 8 HOURS AFTER MIXING.

3.7 Material Safety Data Sheet. A Material Safety Data Sheet shall be prepared for the primer in accordance with FED-STD-313 and forwarded to the qualifying activity (see 6.3). The Material Safety Data Sheet shall be included with each shipment of the material covered by this specification and submitted to pertinent government agencies as stated in appendix B of FED-STD-313 (see 6.7).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. The contractor shall verify that his test, measurement and diagnostic equipment (TMDE) is calibrated in accordance with MIL-STD-45662. Except as otherwise specified, in the contract or order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to the prescribed requirements.

4.1.1 Sampling and inspection. Unless otherwise specified, sampling, inspection and testing shall be in accordance with section 1000 of FED-STD-141.

4.1.2 Material Safety Data Sheet. Material Safety Data Sheets must address components A and B and be in compliance with FED-STD-313 (see 3.7). Noncompliance shall be cause for rejection.

4.2 Classification of test. Testing under this specification shall be for the following:

a. Qualification (see 4.2.1).
b. Acceptance of individual lots (see 4.2.2).
c. Contractor's production testing (see 4.2.3).

4.2.1 Qualification tests. The qualification tests shall consist of tests for all requirements specified in section 3, and as specified in table V (see 6.3).

4.2.2 Individual lot acceptance. Acceptance testing of individual lots shall normally consist of total solids, viscosity, fineness of grind, 60° specular gloss, drying time, condition in container, mixing properties, and spraying properties.

4.2.3 Production inspection. The contractor shall perform production inspections on all primer submitted for delivery. Production inspections shall be performed in accordance with test procedures of section 4 to determine compliance with requirements specified in section 3. All necessary test equipment and facilities required to conduct the subject inspections shall be furnished by the contractor.

4.3 Test methods.

4.3.1 Test conditions. The routine testing condition shall be in accordance with section 9 of FED-STD-141 or in accordance with the appropriate ASTM method except as otherwise specified herein. Failure of any test result to fall within the ranges specified in 3.2, 3.3, 3.4, and 3.5, as applicable, shall constitute failure of the applicable test. The following tests shall be conducted in accordance with FED-STD-141 except as otherwise specified herein. For all tests requiring the use of the mixed primer, parts A and B shall be mixed in the proportions specified in paragraph 4.9.

4.3.2 Test panels. Except as otherwise specified, steel test panels shall be pretreated with a phosphate coating conforming to TT-C-490, type I and aluminum test panels shall be aluminum clad aluminum alloy conforming to QQ-A-250/5 and given the firm treatment with materials conforming to form I or II, method C (immersion), class 1A of MIL-C-81706 to produce coatings meeting the requirements of MIL-C-5541.

4.3.3 Test procedures. The following tests (see table V), shall be conducted in accordance with FED-STD-141 or ASTM 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	Application Method In FED-STD-141	Applicable ASTM Test Method	Test Paragraph	Requirements Paragraph
Pigment analysis	4021	—	4.4.6	3.3.1
Titanium dioxide	—	D 1394	4.4.6.1	Table I
Zinc phosphate	—	—	4.4.6.2	Table I
Hexavalent chromium	—	—	4.4.6.3	Table I
Isolation of vehicle (Supercentrifuge)	—	D 2698	—	3.3.2
Solvent distillation	—	D 3272	4.4.3	3.3.2.3.1
Aromatic compounds	7356	—	—	3.3.2.3.1
Olefinic and Cyclo-olefinic	7356	—	—	3.3.2.3.1
Ketones	7360	—	—	3.3.2.3.1
Volatile organic compounds	—	D 3960	4.4.3.1	3.3.2.3.2
Total solids	—	D 2369	4.4.1	Table II
Pigment solids	—	—	4.4.2	Table II
Vehicle solids	—	—	4.4.2	Table II
Coarse particles and skins	4092	—	—	Table II
Viscosity	—	D 562	—	Table II
Fineness of grind	—	D 1210	—	Table II
Amine nitrogen content	7391	—	—	Table III
Epoxy resin	—	—	4.4.5.2	Table III
Weight per gallon	—	D 1475	—	Table III
60° specular gloss	—	D 523	4.5	Table IV
Drying time	4061	—	4.6	Table IV
Lead metal	—	D 3335	4.4.4	Table IV
Condition in container	3011, 4261	—	4.7	3.5.1
Storage stability-full container	3011, 4261	—	4.8	3.5.2
Mixing properties	—	—	4.9	3.5.3
Spraying properties	4331	—	4.10	3.5.4
Adhesion	—	—	4.11	3.5.5
Knife test	6304	—	4.12	3.5.6
Flexibility	6221	—	4.13	3.5.7
Water resistance	—	D 1308 sec. 6.4	4.14	3.5.8

Table V. Index. (Cont'd)

Item	Application Method In FED-STD-141	Applicable ASTM Test Method	Test Paragraph	Requirements Paragraph
Hydrocarbon resistance	—	D1308 sec. 6.4	4.15	3.5.9
Salt spray resistance	—	B 117	4.16	3.5.10
Topcoating	—	—	4.17	3.5.11
Weather resistance	—	D 1006	4.18	3.5.12
DS2 resistance	—	—	4.19	3.5.13
Toxic ingredients	—	—	4.20	3.5.14
Packaging	—	—	4.21	—

4.4 Analysis of primer.

4.4.1 Nonvolatile (total solids) content. Determine the nonvolatile (total solids) content in accordance with ASTM D 2369, procedure B. 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.

4.4.2 Pigment and vehicle solids. Place approximately 75 mLs of well mixed part A in the bowl of a supercentrifuge capable of developing at least 40,000 rpm. Rotate at 40,000 to 50,000 rpm for a period of 30 minutes, or until clear. Pour off the clear liquid into a small flask which is immediately stoppered to prevent evaporation of the volatile portion. Run the vehicle solids on the recovered portion as in 4.4.1 but do not thin at all. Save rest of recovered vehicle for other tests.

Calculations:

Symbols: P = % Pigment in primer.
T.S. = % Total solids in primer (4.4.1)
VS = % Vehicle solids in primer
N.V.V. = % Nonvolatile in vehicle (above)

a. Pigment = $P = \frac{100\ (T.S. - N.V.V.)}{}$
b. Vehicle solids = (100 - N.V.V.) = V.S. = T.S. - P

Nonconformance to the requirements in table II shall constitute failure of this test.

4.4.3 Solvent analysis. For type I, vacuum distill the solvents from parts A and B using ASTM D 3272. Analyze a mixture of 8 mL A and 1 mL B using method 7356 of FED-STD-141. Determine compliance with 3.3.2.3.1.

4.4.3.1 Volatile organic compound (VOC) determination. For type II, determine the VOC of part A and part B in accordance with ASTM D 3960. The density is determined by using the weight-per-gallon cup described in ASTM D 1475. The nonvolatile content is determined by using ASTM D 2369.

Calculate the VOC for the coating as mixed with the equation:

$$\frac{4(\text{VOC of part A}) + (\text{VOC of part B})}{5} = \text{VOC pounds per gallon of mixed coating}$$

Determine compliance with 3.3.2.3.2

4.4.4 Lead content.

4.4.4.1 Determination of lead by atomic absorption spectroscopy. Determine percent of lead in accordance with ASTM D 3335. Nonconformance to table IV shall constitute failure of this test.

4.4.4.2 Determination of lead by X-ray emission spectrometric analysis (alternate method).

4.4.4.2.1 Test panel preparation. Using 100 grams of a known lead free primer, prepare standard aliquots containing 0.00, 0.03, 0.06, and 0.09 percent lead metal, based on total nonvolatile paint, by adding calculated amounts of lead napthenate of a known lead content. Thoroughly mix the aliquots to incorporate the lead and draw down the standards and mixed primer to be tested on duplicate black and white Morest cards using a 0.0020 inch (0.004 inch gap clearance) film applicator. Dry for 48 hours at a temperature of 23 $\pm$1.1 °C (73.4 $\pm$2 °F), a relative humidity of 50 $\pm$4 percent, and under dust free conditions. Cut the drawdowns into a suitable size and shape to fit the sample holder of the x-ray fluorescence spectrometer.

4.4.4.2.2 X-ray analytical procedure. Lead content shall be determined using an x-ray fluorescence spectrometer capable of determining lead content at a minimum level of 0.03 percent by weight of the total nonvolatile paint. The parameters of angle, crystal, pulse height selection, counting time, collimator, x-ray tube, voltage and amperage, shall be established for a wave length dispersive fluorescence spectrometer according to conventional x-ray analytical procedures. The analytical line Pb L-alpha or Pb L-beta shall be used. To calibrate, place the known standards in the x-ray unit and measure the count rates of lead, lead background and the Compton scattered background from the x-ray tube. The ratio R, of net lead intensity and Compton scattered background is calculated as follows:

$$R = \frac{I_{pb} - \left(\frac{I_{pb\ Background\ I} + I_{pb\ Background\ II}}{2}\right)}{I_{Compton\ Line}}$$

Where I = Gross intensity
and the background is taken on each side of the Pb line.
Establish a lead calibration curve using these results. Determine the lead content of the test paint using the above procedure and calibration curve. When using an energy dispersive fluorescence spectrometer, it shall be set up in accordance with the manufacturer's manual. Nonconformance to table IV shall constitute failure of this test.

4.4.5 Analysis of vehicle.

4.4.5.1 Epoxy resin - part A. Determine the epoxy resin content on the extracted vehicle in accordance with method 7401 of FED-STD-141 for compliance with table II. Nonconformance to table II constitutes failure of this test.

4.4.5.2 Epoxy resin - part B. Place 4 drops of part 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. After cooling, add 1 mL concentrated sulfuric acid and warm to about 60 °C 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 will form almost immediately if epoxy resins of the bisphenol type are present. Nonconformance to table III constitutes failure of this test.

4.4.5.3 Amine nitrogen content - part B. Determine the amine nitrogen content as in method 7391 of FED-STD-141. Nonconformance to table III constitutes failure of this test.

4.4.5.4 Weight per gallon - part B. Determine the weight per gallon of part B in accordance with ASTM D 1475 and check for compliance with table III. Nonconformance to table III constitutes failure of this test.

4.4.6 Analysis of pigment. Extract the pigment as in method 4021 of FED-STD-141.

4.4.6.1 Titanium Dioxide (TiO_2) content. Determine the titanium dioxide (TiO_2) content on the extracted pigment in accordance with ASTM D 1394 for compliance with table I. Nonconformance to table I shall constitute failure of this test.

4.4.6.2 Zinc phosphate content. Determine the zinc phosphate content in accordance with 4.4.6.2.1 and 4.4.6.2.2.

4.4.6.2.1 Determination of zinc.

4.4.6.2.1.1 Reagents.

a. Buffer solution (pH 10): 350 mL conc. NH_4OH + 54g NH_4Cl + H_2O to give 1000 mL.
b. Eriochrome black T (0.5%): 0.25g eriochrome black T + 2.2g hydroxylamin hydrochloride per 50 mL methanol solution.
c. Primary standard zinc oxide (0.200N): Accurately weigh 4.069g of oven-dried ZnO. Dissolve it in 250 mL of the buffer solution and dilute to 500.0 mL.
d. 0.5N Disodium ethylenediaminetetraacetate dihydrate (EDTA): 37.2g EDTA per liter aqueous solution.

4.4.6.2.1.2 Procedure.

a. Accurately weigh approximately 1.0 gram of pigment into a 250 mL glass-stoppered Erlenmeyer flask.
b. Add 25 mL of 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 ESTA (an excess) to the filtrate.
e. Add 10 drops of eriochrome black T.
f. Titrate with standard ZnO to a wine-red end point (V_s).
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).

4.4.6.2.1.3 Calculations.

$$\text{percent Zn} = \frac{(V_b - V_s) \times 0.02 \times 3.269}{\text{Sample wt}}$$

$$\text{percent zinc phosphate} = \frac{(V_b - V_s) \times 0.2 \times 7.035}{\text{Sample wt}}$$

4.4.6.2.2 Determination of phosphate.

4.4.6.2.2.1 Reagents.

a. Conc NH_4OH

b. Conc HNO_3

c. NH_4NO_3

hard settling of the pigments. Only selected pigments

d. Ammonium molybdate - Johnson's Formula: Mix 55g of $(NH_4)_6MO_7O_{24} \cdot 4H_2O$ and 50g of NH_4NO_3 with 18 mL of conc 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.

4.4.6.2.2.2 Procedure.

a. Accurately weigh approximately 2g 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 grams 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 conc HNO_3 per 500 mL solution. The washing should 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 should not exceed 3g; if it does, repeat the determination with a smaller sample).

4.4.6.2.2.3 Calculations.

$$\text{percent } PO_4 = \frac{\text{wt. ppt. x } 5.029}{\text{Sample wt.}}$$

$$\text{percent zinc phosphate } [Zn_3(PO_4)_2 \cdot 2H_2O] = \frac{\text{wt. ppt. x } 11.18}{\text{Sample wt.}}$$

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

4.4.6.3 Hexavalent chromium (Cr^{6+} must be absent).

a. Reagents:

1. 25 percent aqueous KOH

b. Procedure:

1. Add 5 mL of 25 percent aqueous KOH to 0.5g of the extracted pigment contained in a 15 mL centrifuge tube.
2. Agitate by shaking the tube for a few minutes then centrifuge.
3. The supernatant liquid should be colorless. A yellow color indicates presence of chromate. Nonconformance to the requirement in table I shall constitute failure of this test.

4.5 Specular gloss (60 degree). Prepare a drawdown of the catalyzed primer on a black and white Morest card to a dry film thickness of 0.001 ±0.0001 inch. Dry for 48 hours and determine the 60 degree gloss in accordance with ASTM D 523. Nonconformance to table II shall constitute failure of this test.

4.6 Drying time. Determine drying time as in method 4061 of FED-STD-141 under routine conditions, except that the primer shall be sprayed to a dry film thickness of 0.0009 to 0.0011 inch for type I and to a dry film thickness of 0.0010 to 0.0015 inch for type II. Nonconformance to table IV shall constitute failure of this test.

4.7 Condition in container.

4.7.1 Part A. Determine package condition of part A on acceptance testing in accordance with method 3011 of FED-STD-141 and observe for compliance with 3.5.1.1. On qualification testing, evaluate pigment settling or caking by proceeding as in method 3011 of FED-STD-141 but do not stir. Reseal and then agitate the can for 3 minutes on a paint shaker.1/ On re-examination of the contents, the disclosure of any gel bodies or undispersed pigment indicates unsatisfactory settling properties. Nonconformance to 3.5.1.1 constitutes failure of this test.

4.7.2 Part B. Determine package condition of part B in accordance with method 4261 of FED-STD-141 and observe for compliance with 3.5.1.2. Nonconformance to 3.5.1.2 constitutes failure of this test.

4.8 Storage stability.

4.8.1 Part A. Allow a full can of part A to stand undisturbed for 12 months at 72 to 80 °F and then examine the contents. Evaluate the pigment settling as in 4.7.1 except agitate the can for 5 minutes on the paint shaker prior to re-examination. Determine viscosity and other applicable tests for compliance with 3.5.2.1. Nonconformance to 3.5.2.1 shall constitute failure of this test.

4.8.2 Part B. Allow a full 8 ounce can of part B to stand undisturbed for 12 months. At the end of this period examine the contents in accordance with method 4261 of FED-STD-141 for compliance with 3.5.2.2. Nonconformance to 3.5.2.2 shall constitute failure of this test.

1/ An apparatus of this type, powered by 1/4 hp motor operates at a rate of 1350 shakes per minute, and is manufactured by Red Devil Tools, Irvington, N.J.

4.9 Mixing properties. Thoroughly mix 4 parts by volume of part A with one part by volume of part 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.

4.10 Spraying properties. If necessary for application, reduce four parts of the mixed primer by volume with one part of MIL-T-81772. For type II, the solvent MIL-T-81772 can be used or follow manufacturer's recommendations not to exceed the VOC level (see 1.2). Spray on a steel panel to a dry film thickness between 0.0009 and 0.0011 inch and observe for spraying properties in accordance with method 4331 of FED-STD-141 for compliance with 3.5.4.

4.11 Adhesion. Spray the primer as in 4.10 on a steel and aluminum panel pretreated as in 4.3.2. Air dry type I specimens for four hours and type II specimens for six hours and then score a line through to the metal across the width of the film using a sharp pointed knife. The film shall then be taped perpendicular to and across the score line with water resistant, pressure sensitive adhesive tape (3/4-inch width) conforming to PPP-T-60, type IV. The tape shall be pressed down with two passes of a 4-1/2 pound rubber-covered roller, approximately 3-1/2 inches in diameter by 1-3/4 inches in width. The surface of the roller shall have a durometer hardness value within the range of 70 to 80.2/ Allow 10 seconds for the test area to return to room temperature. Grasp a free end of the tape and at a rapid speed, strip it from the specimen by pulling tape back upon itself at 180 degrees and check for film removal. Nonconformance to 3.5.5 shall constitute failure of this test.

4.12 Knife test. Prepare films of primer as in 4.11 and air dry 3 days for type I and 7 days for type II. Perform the knife test as in method 6304 of FED-STD-141. Nonconformance to 3.5.6 shall constitute failure of this test.

4.13 Flexibility. Prepare films of the primer as in 4.11 except substitute a thin gauged steel panel prepared in accordance with method 2012 of FED-STD-141, using the petroleum naphtha proylene glycol monomethyl ether mixture. Allow the panels to air dry 3 days for type I and 7 days for type II and then bend over a 1/4 inch mandrel as in method 6221 of FED-STD-141. Examine for compliance with 3.5.7. Nonconformance to 3.5.7 constitutes failure of this test.

4.14 Water resistance. Prepare sprayed films of primer as in 4.11. Air dry 3 days for type I and 7 days for type II. Coat all exposed, uncoated metal surfaces with wax or other suitable coating. Immerse the panels for 168 hours in distilled water at 23 $\pm$1 °C as specified in ASTM D 1308, section 6.4. On removal, observe panels for compliance with 3.5.8. Nonconformance to 3.5.8 constitutes failure of this test.

2/ A roller of this type is available from the Pressure Sensitive Tape Council, 1201 Waukegan Road, Glenview, Illinois 60025.

4.15 Hydrocarbon fluid resistance. Prepare films of primer as in 4.11 and air dry 3 days for type I and 7 days for type II. Do not wax or coat the exposed metal surfaces. Immerse the panels for 168 hours in a hydrocarbon fluid conforming to TT-S-735, type III as specified in ASTM D 1308, section 6.4. Upon removal, examine for compliance with 3.5.9. Nonconformance to 3.5.9 shall constitute failure of this test.

4.16 Salt spray resistance. Prepare three 4 by 12 inch test panels each as in 4.11 and air dry type I for 3 days and type II for 7 days. Expose the unscored panels to 5 percent salt spray for 336 hours in accordance with ASTM B 117. Upon removal, wash the panels gently in warm running water until free from any visible salt deposits and examine immediately for compliance with 3.5.10. Nonconformance to 3.5.10 shall constitute failure of this test.

4.17 Topcoating. Prepare 2 test panels each as in 4.11. Allow to air dry 15 minutes and 24 hours respectively and spray a coat of green 383, 34094 urethane conforming to MIL-C-46168 or MIL-C-53039 over the specimens. The urethane shall be thinned for spray as required by it's specification and the dry film thickness shall be a minimum of 0.0018 inch. Examine the panels for evidence of lifting after the coating has air dried 2 hours. Allow the specimens to air dry 168 hours after recoating. Cut film with a knife blade and check for compliance with 3.5.11. Nonconformance to 3.5.11 constitutes failure of this test.

4.18 Weather resistance. Prepare four, 4 by 12 inch unscored panels (2 of each substrate) of the primer as in 4.11. Allow the primer to air dry for 24 hours and then apply a coat of green 383, 43094 urethane as in 4.17. Allow to air dry 7 days and place on exposure for 18 months at an angle of 45 degrees facing south inn the vacinity of the Washington, DC area. Examine for compliance with 3.5.12. Nonconformance to 3.5.12 shall constitute failure of this test.

4.19 DS2 resistance. Prepare a steel panel as specified in 4.10. Air dry the panel 1 day, then bake for 1 day at 105 $\pm$2 °C (221 $\pm$2 °F). Allow the panel to return to room temperature and place 2 spots approximately 1/2 mL each of DS2 agent of the panel surface. Do not cover, allow to stand 30 minutes, then thoroughly wash with water. Examine for compliance with 3.5.13. Nonconformance to 3.5.13 shall constitute failure of this test.

4.20 Toxic ingredients. The manufacturer shall certify that the primer contains no benzene (benzol), chlorinated solvents or ethylene based glycol ethers and their acetates. Nonconformance to 3.5.14 constitutes failure of this requirement.

4.21 Inspection of packaging.

4.21.1 Quality conformance inspection of packaging.

4.21.1.1 Unit of product. For the purpose of inspection, a complete pack prepared for shipment shall be considered a unit of product.

4.21.1.2 Sampling. Sampling for examination shall be in accordance with MIL-STD-105.

4.21.1.3 Examination. Samples selected in accordance with 4.21.1.2 shall be examined for the applicable defects listed below. The acceptable quality level (AQL) shall be 1.0 percent defective.

No.	Defect	A	B	Comm.
101.	Primary containers not of the types specified.	5.1.1.3		5.1.1.4
102.	Primary containers not coated as specified.	5.1.1.3		
103.	Closure of the primary containers not as specified.	5.1.1.3		5.1.1.4
104.	Primary containers not placed in unit containers as specified.	5.1.2		5.1.2
105.	Unit containers not as specified.	5.1.2.1		5.1.2.2
106.	Unit containers not placed in intermediate containers as specified.	5.1.3		5.1.3
107.	Intermediate containers not as specified.	5.1.3.1		5.1.3.2
108.	Unlike kits packed in same shipping container.	5.2.1	5.2.2	5.2.3
109.	Shipping containers not as specified.	5.2.1	5.2.2	5.2.3
110.	Standard marking not as specified.	5.3.1	5.3.1	5.3.2
111.	Additional marking not as specified.	5.3.3/3.6	5.3.3/3.6	5.3.3/3.6

5. PACKAGING.

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

5.1.1 Primary containers.

5.1.1.1 Part A (Epoxy resin component). The primary containers for part A shall be 1-quart or 1-gallon multiple friction plug containers, or 4-gallon or 5-gallon lug cover steel pails, as specified (see 6.2). When 5-gallon steel pails are specified, they shall contain but 4-gallons of the epoxy resin component.

5.1.1.2 Part B (Catalyst component). The primary containers for part B shall be 1/2 pint, 1-quart or 1-gallon, multiple friction plug containers, as specified (see 6.2).

5.1.1.3 Level A. Primary containers, of the types and sizes specified in 5.1.1 (see 6.2), shall comply with the following requirements:

a. Multiple friction plug containers shall be in accordance with PPP-C-96, type V, class 2. Interior coatings as applicable, shall be as specified therein. Exterior coatings, including side seam stripping, shall be as specified therein for plan B. Wire handles as specified therein shall be provided for the 1-gallon container. Closure of the filled and properly sealed cans shall be as specified in the appendix thereto.
b. Lug cover steel pails shall be in accordance with PPP-P-704, type II or III, class as applicable. Interior coatings and exterior coatings shall be as specified therein. Closure of filled and properly sealed pails shall be as specified in the appendix thereto.
c. The containers shall comply with the requirements of the Uniform Freight Classification (UFC) or the National Motor Freight Classification (NMFC) and the applicable requirements of the code of Federal regulations 49 CFR, Department of Transportation (DOT).

5.1.1.4 Commercial. Primary containers, of the types and sized specified in 5.1.1 (see 6.2), shall be furnished in those containers normally used for products of this nature providing there will be no interaction chemically or physically with the contents so as to damage the container or alter the strength, quality or purity of the contents. The containers shall comply with the requirements of the UFC or NMFC and the requirements of 49 CFR.

5.1.2 Unit (kit) containers. Components A and B, in the primary containers specified in 5.1.1, shall be placed in unit (kit) containers in the ratio of 4 parts by volume of part A to one part by volume of part B (see 3.3), in the following manner:

a. One, 1-quart primary container of part A shall be placed in a unit container with one, 1/2 pint primary container of part B.
b. One, 1 gallon primary container of part A shall be placed in a unit container with one, 1 quart primary container of part B.
c. One, 4 gallon primary container of part A or one, 5 gallon primary container with but 4-gallons of part A, shall be placed in a unit container with one, 1 gallon primary container of part B.

5.1.2.1 Level A. Unit containers, required of the component combinations in 5.1.2, shall be in accordance with PPP-B-636, type CF, grade V3c, W5c or W6c as applicable, style optional. The primary containers shall be arranged within the

unit container to provide the smallest practical cubage and permit the application of cushioning and functional filler devices. Such cushioning and fillers shall completely fill the container. Container closure shall be in accordance with method IV of the appendix to PPP-B-636. Containers shall comply to UFC or NMFC, and 49 CFR requirements.

5.1.2.2 Commercial. Unit containers, required of the component combinations in 5.1.2, shall be close-fitting corrugated fiberboard boxes in accordance with UFC, or NMFC, and 49 CFR requirements. Cushioning and filler devices shall be utilized to prevent damage to the contents during shipment, handling, storage and redistribution.

5.1.3 Intermediate containers. The primer, in the unit containers specified in 5.1.2, shall be placed in intermediate containers in the following manner:

a. Eight unit containers, each with one, 1 quart primary container of part A and one, 1/2 pint primary container of part B shall be placed in an intermediate container.
b. Four unit containers, each with one, 1 gallon primary container of part A and one, 1 quart primary container of part B shall be placed in an intermediate container.
c. Intermediate containers are not required for the 4 gallon to 1 gallon unit container combination of parts A and B.

5.1.3.1 Level A. Intermediate containers for the primer quantities specified in 5.1.3 shall comply with the requirements of PPP-B-636, type CF, grade V3c or W5c as applicable, style optional. The containers shall be close fitting and closure shall be in accordance with method IV of the appendix thereto. Containers shall comply with UFC or NMFC, and 49 CFR requirements.

5.1.3.2 Commercial. Intermediate containers for the primer quantities specified in 5.1.3 shall be close-fitting corrugated fiberboard boxes in accordance with UFC or NMFC, and 49 CFR requirements.

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

5.2.1 Level A. Intermediate containers of like kits shall be packed in close-fitting wood boxes conforming to PPP-B-601, overseas type, or PPP-B-621, class 2. Box closure shall be as specified in the applicable box specification or the appendix thereto except that strapping shall be flat steel and finish shall be "B". Unit containers of the 4 gallon to 1 gallon ratio of parts A to B shall be packed for level A in the same manner.

5.2.2 Level B. Level B packing shall be as specified for level A packing in 5.2.1 except that boxes shall be domestic type or class and the metal strapping shall be finish A.

5.2.3 Commercial. The primer, in intermediate containers and unit containers as specified in 5.1.3, shall be packed in multiples of like kits in accordance with UFC or NMFC, and 49 CFR requirements.

5.3 Marking.

5.3.1 Levels A and B. Each primary container, unit container, intermediate container and shipping container shall be marked in accordance with the requirements of
PPP-P-1892.

5.3.2 Commercial. Commercial marking shall be in accordance with ASTM D 3951 and 49 CFR. Additionally, each shipping containers shall be marked with the cube and gross weight.

5.3.3 Additional marking. In addition to any special or identification marking required by the contract or purchase order (see 6.2) and by 5.3.1 and 5.3.2, each primary container shall be marked as specified in 3.6.

5.4 Precedence. If there is any conflict between the requirements of this section and the Department of Transportation Regulation 49 CFR for the types of containers specified, the contractor or manufacturer shall give the purchasing officer a statement in writing about the conflict and obtain instructions before proceeding with the packaging of the primer.

6. NOTES

6.1 Intended use. This specification is intended for use on properly cleaned and pretreated ferrous and nonferrous substrates. It is a lead and chromate free primer that may be used to replace MIL-P-52192 and MIL-P-23377 where exposure to lead or chromate pigments is not permitted. Type II formulations will meet a 420 gram/liter maximum (3.5 pound/gallon) volatile organic compound (VOC) content requirement.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification.
b. Date of issue of DoDISS applicable and exceptions thereto (see 2.1.1).
c. Type of coating required (see 1.2).
d. Degree of preservation and packing required (see 5.1 and 5.2 respectively).
e. Size of primary container required for part A and size of primary container required for part B (see 3.3 and 5.1.1).
f. Any special markings (see 5.3.3).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the 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 orders for products covered by this specification. The activity responsible for the qualified products list is: Commander, US Army Belvoir Research, Development and Engineering Center, Fort Belvoir, VA 22060-5606, ATTN: STRBE-VO and information pertaining to qualification of products may be obtained from that activity.

6.4 Primer. The primer covered by this specification should be purchased by volume, the unit being one US gallon of 231 cubic inches at 68 °F (20 °C).

6.5 Samples. It is believed that this specification adequately describes the characteristics necessary to secure the desired material and that normally no samples will be necessary prior to award to determine compliance with this specification. If, for any particular purpose, samples with bids are necessary, they should be specifically asked for in the invitation for bids, and the particular purpose to be served by the bid sample should be definitely stated: the specification to apply in all other respects.

6.6 Limitations of olefinic test. The test for olefinic and cycle-olefinic compounds will not be positive for solvents containing less than 1 percent of these compounds.

6.7 Material Safety Data Sheet. Contracting Officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent Government mailing address for submission of data are listed in appendix B of FED-STD-313.

6.8 Color difference equation. The correct color difference equation is entitled "Hunter's Revised National Bureau of Standards (NBS) COlor Difference Equation". One reference source is "Color in Business, Science, and Industry", (Wiley, NY).

6.9 Subject term (key word) listing.

Corrosion-resistant primer
Epoxy
Primer
Volatile organic compound (VOC) compliant

6.10 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - ME
Navy - AS

Review activities:

Army - AR, AV

User activities:

Army - ER
Navy - EC, OS

Preparing activity:

Army - ME

Project: 8010-1255

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use submitting comments and suggestions for improvements. All users of military standardization documents are invited to provi suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, a mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-P-53022B	Primer, Epoxy Coating, Corrosion Inhibiting, Lead and Chromate Free

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
	☐ USER
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

...are retained containers) is 2 years.