

INCH-POUND

MIL-C-4556E  
14 September 1990  
SUPERSEDING  
MIL-C-4556D  
5 November 1971

## MILITARY SPECIFICATION

## COATING KIT, EPOXY, FOR INTERIOR OF STEEL FUEL TANKS

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 two-component epoxy coating system for protecting interior surfaces of steel tanks used for the transportation and storage of fuels. The coating, furnished as a kit, is lead and chromate free and meets air pollution requirements for solvent emissions (see 6.1).

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

## FEDERAL

PPP-P-1892 - Paint, Varnish, Lacquer and Related Materials;  
Packaging, Packing and Marking of.

## MILITARY

MIL-T-83133 - Turbine Fuel, Aviation, Kerosene Type, Grade JP-8.

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, ATTN: STRBE-TSE, Fort Belvoir, VA 22060-5606 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8010

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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## 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 Sheets.
- FED-STD-595 - Colors.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents. The following other Government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

## CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.1200 - Material Safety Data Sheet; Preparation and Submission of.

(Application for copies of should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

2.2 Non-Government 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 are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues cited in the solicitation (see 6.2).

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- D 185 - Coarse Particles in Pigments, Pastes and Paint.
- D 476 - Titanium Dioxide Pigments.
- D 562 - Consistency of Paints using the Stormer Viscometer.
- D 1210 - Fineness of Dispersion of Pigment-Vehicle System.
- D 1640 - Drying, Curing, or Film Formation of Organic Coatings at Room Temperature.
- D 1729 - Visual Evaluation of Color Differences of Opaque Materials.
- D 2371 - Pigment Content of Solvent-Reducible Paints.
- D 2794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- D 2805 - Hiding Power of Paints by Reflectometry.
- D 3278 - Flash Point of Liquids by Setaflash Closed Tester.
- D 3335 - Low Concentrations of Lead, Cadmium and Cobalt in Paint by Atomic Absorption Spectroscopy.
- D 3359 - Measuring Adhesion by Tape Test.
- D 3960 - Determining Volatile Organic Content (VOC) of Paints and Related Coatings.

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

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### STEEL STRUCTURES PAINTING COUNCIL (SSPC) SPECIFICATIONS

SSPC-SP5 - Metal Blast Cleaning, White Surface Preparation.

(Application for copies should be addressed to the Steel Structures Painting Council, 4400 Fifth Avenue, Pittsburgh, Pennsylvania 15213.)

(Non-Government standards and other publications are normally available from the organizations that prepare or 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 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 coatings furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable Qualified Products List at the time set for opening of bids (see 4.2.1.1 and 6.4). Any change in the formulation of a qualified product will necessitate its requalification. The material supplied under the contract shall be identical, within manufacturing tolerance, to the product receiving qualification.

3.2 Materials. The materials used in the coating shall as specified herein. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification.

3.2.1 Toxic products and formulations. The material shall have no adverse effect on the health of the personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate departmental medical service which will act as an advisor to the contracting agency.

3.2.2 Material Safety Data Sheet. A Material Safety Data Sheet (MSDS) shall be prepared and submitted in accordance with FED-STD-313 and shall meet the requirements of 29 CFR 1910.1200 (see 6.4). When FED-STD-313 is at variance with the CFR, 29 CFR 1910.1200 shall take precedence, modify and supplement FED-STD-313 (see 4.1.1). The MSDS shall be included with each shipment of the material covered by this specification and submitted to pertinent Government agencies as stated in FED-STD-313, appendix B.

3.2.3 Prohibited material. The product shall not contain benzene, chlorinated solvents or ethylene based glycol ethers and their acetates. The lead content shall not exceed 0.06 percent of the nonvolatile content. Chromium (hexavalent) compounds shall not be used (see 3.4.1.1).

3.3 Color. When tested as specified in 4.3.4, the primer shall be an approximate match to color number 23594 and the topcoat shall not be darker than color number 27780 of FED-STD-595.

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3.4 Composition. The coating kit shall consist of a yellow primer and a white topcoat. Each shall be furnished in two parts: component A, containing pigmented epoxy resins, and component B, containing the clear curing agent. When mixed four parts by volume of component A with one part by volume of component B, products meeting the applicable requirements of this specification shall result.

3.4.1 Pigments. The pigment portion of the primer, component A, shall consist of titanium dioxide (PW 6), ASTM D 476, type III or IV, iron oxide yellow (PY 42), and extenders. The pigment portion of the topcoat, component A, shall consist of titanium dioxide (PW 6), ASTM D 476, type III or IV and extenders.

3.4.1.1 Lead and chromate (hexavalent) content. When tested as specified, the lead content shall not exceed 0.06 percent by weight of the total non-volatile content (see 4.3.5) and the test for hexavalent chromium shall be negative (see 4.3.6).

3.4.2 Vehicle.

3.4.2.1 Component A. Component A shall consist of bisphenol A or bisphenol F epoxy resins, pigments, extenders, additives and solvents in any ratio necessary to meet the requirements of this specification.

3.4.2.2 Component B. Component B shall consist of polyamides, polyamidoamines, polyamines, and polyamine adducts in any ratio necessary to meet the requirements of this specification.

3.4.3 Solvents. The coating shall not contain any benzene, chlorinated compounds or ethylene based glycol ethers and their acetates. Solvents used shall meet the requirements of 3.2.1.

3.4.4 Volatile organic content (VOC). When tested according to 4.3.2, the volatile organic content of the mixed coating (see 4.3.7) shall not exceed 2.8 pounds per gallon (340 grams/liter).

3.5 Qualitative requirements.

3.5.1 Mixed coating. The mixed primer and topcoat (see 4.3.7) shall individually conform to the quantitative requirements of table I when tested as specified in section 4.

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TABLE I. Quantitative requirements.

Characteristic	Requirements	
	Minimum	Maximum
Total pigment, percent of nonvolatile		60
Viscosity, KU		90
Fineness of grind	3	
Coarse particles, percent by weight of mixed coating		1.0
Flash point, °F	95	
Drying time		
Set-to-touch		5
Dry hard, hours		18
Contrast ratio		
White	0.96	
Yellow	0.98	

3.6 Qualitative requirements.3.6.1 Condition in container.

3.6.1.1 Component A. When tested as specified in 4.3.10.1, component A shall be free from grit, seeds, skins, abnormal thickening, livering or other defects in a freshly opened container and shall show no more pigment settling or caking than can be easily and completely reincorporated into a smooth, uniform, homogeneous state.

3.6.1.2 Component B. When tested as specified in 4.3.10.2, component B shall be clear and free from sediment and suspended matter. It shall show no livering, curdling, gelling or skinning in a freshly opened container.

3.6.2 Storage stability.

3.6.2.1 Component A. When tested as specified in 4.3.11.1, component A shall show no skinning, livering, curdling, hard dry caking or tough gummy sediment. It shall remix readily to a smooth homogeneous state and shall meet all other requirements of this specification.

3.6.2.2 Component B. When tested as specified in 4.3.11.2, a can of component B shall be clear and free from sediment and suspended matter. It shall show no livering, curdling, gelling, or skinning in a freshly opened container.

3.6.3 Mixing properties. When tested as specified in 4.3.12, smooth homogeneous mixtures shall result free from grit, seeds, skins or lumps.

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3.6.4 Spraying properties. When tested as specified in 4.3.13, the coatings shall spray satisfactorily in all respects and shall show no running, sagging or streaking. The dried films shall show no dusting, mottling or color separation and shall present a smooth finish free from any defects.

3.6.5 Brushing properties. When tested as specified in 4.3.14, the coatings shall brush easily. They shall dry to smooth, uniform films free from sags, runs and streaks.

3.6.6 Knife test. When tested as specified in 4.3.15, the coating shall adhere tightly to and not flake or crack from the metal surface. The cut shall show beveled edges and there shall be no delamination between the primer and the topcoat.

3.6.7 Pot life. When tested as specified in 4.3.16, the viscosity of each sample, 4 hours after mixing its two components, shall be a maximum of 100 krebs units (KU) and it shall meet all of the requirements of 3.6.4.

3.6.8 Fuel and water resistance. When tested as specified in 4.3.17, the panels, upon removal, shall show no softening or loss of adhesion. A moderate darkening of the area immersed in JP-8 fuel is acceptable. There shall be no blistering to a greater extent than three small random blisters. Blister formation within 1/4 inch of the panel edge shall be ignored.

3.6.9 Adhesion. When tested as specified in 4.3.18, both areas of each panel shall have a rating of 3B or higher. There shall be no evidence of film separation between primer and topcoat.

3.6.10 Impact resistance. When tested as specified in 4.3.19, the area showing cracking and a slight loss of adhesion shall be no greater than 15 mm in diameter.

3.6.11 User instruction marking. In addition to the markings specified (see 5.1), all containers shall be legibly marked or labeled with the following:

"CAUTION: The Surgeon General required 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. Keep containers tightly closed. For other safety recommendations refer to the Material Safety Data Sheet."

#### 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. Except as otherwise specified in the contract or purchase 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 supplies and services conform to prescribed requirements.



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4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Material Safety Data Sheet. Material Safety Data Sheets not prepared in accordance with FED-STD-313 and 29 CFR 1910.1200 shall be cause for rejection. The contractor shall overpack a copy of the MSDS with each shipment of material.

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

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

- a. Qualification (see 4.2.1.1 and 6.4).
- b. Acceptance (see 4.2.1.2).
- c. Quality conformance (see 4.2.1.3).

4.2.1.1 Qualification testing. Qualification testing shall be conducted by the qualifying activity (see 6.4). Qualification inspection shall consist of tests for all requirements specified in section 3. The results of each test shall be compared with the applicable requirements in section 3. Failure to conform to any requirement shall be counted as a defect, and the paint represented by the sample tested shall not be approved for inclusion in the Qualified Products List (QPL) under this specification.

4.2.1.2 Acceptance testing. Acceptance testing of individual lots shall consist of viscosity, fineness of grind, VOC, drying time, condition in container, mixing properties, spraying properties, percent total pigment and flash points as specified in section 3.

4.2.1.3 Quality conformance testing. When approved by the cognizant activity, acceptance of lots for use as a component of an end item shall be based on conformance with specified requirements for the following characteristics: Condition in container, color, drying time, pot life, adhesion, and fuel and water resistance as specified in section 3.

4.3 Test methods.

4.3.1 Test conditions. The testing conditions shall be in accordance with FED-STD-141, section 9 or in accordance with the appropriate ASTM method except as otherwise specified herein. For referee testing, all test specimens shall be prepared and tested at a temperature of 20 to 32 °C (68 to 90 °F) and a relative humidity of 40-65 percent. Failure of any test result to fall within the ranges specified in section 3 as applicable, shall constitute failure of the applicable test.

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4.3.2 Tests procedures. The following tests (see table II) shall be conducted in accordance with FED-STD-141, ASTM, or as specified herein. The right is reserved to make any additional tests deemed necessary to determine that the coating meets the requirements of this specification.

TABLE II. Index.

Test	Test Paragraph	Requirement Paragraph	ASTM Method	FED-STD-141 Method
Color	4.3	3.3	D 1729	-
Pigment content	-	3.5.1	D 2371	-
Pigment analysis	-	3.4.1	D 2371	-
Lead content	4.3.5	3.4.1.1	D 3335	-
Chromium content	4.3.6	3.4.1.1	-	-
Volatile organic content	-	3.4.4	D 3960	-
Viscosity	4.3.7	3.5.1	D 562	-
Flash point	4.3.8	3.5.1	D 3278	-
Drying time	4.3.9	3.5.1	D 1640	-
Coarse particles	-	3.5.1	D 185	-
Fineness of grind	-	3.5.1	D 1210	-
Condition in container	4.3.10	3.6.1	-	-
Storage stability	4.3.11	3.6.2	-	3011, 4261
Mixing properties	4.3.12	3.6.3	-	3011, 4261
Spraying properties	4.3.13	3.6.4	-	4331
Brushing properties	4.3.14	3.6.5	-	4321
Knife test	4.3.15	3.6.6	-	6304
Pot life	4.3.16	3.6.7	-	-
Fuel and water resistance	4.3.17	3.6.8	-	-
Adhesion	4.3.18	3.6.9	D 3359	-
Impact resistance	4.3.19	3.6.10	D 2794	-
Contrast ratio	4.3.20	3.5.1	D 2805	-
Solvents	4.3.21	3.4.3	-	-

4.3.3 Test panels. Except as otherwise specified, test panels shall be cold rolled steel, SAE 1010 low carbon, 3 by 6 inches, 0.032 inch thick <sup>1/</sup>. They shall be abrasive blasted with fresh sand to a smooth uniform appearance in compliance with SSPC-SP5. Sand blast only the side that has been abrasive ground by the manufacturer. Sand blast prior to testing only and store in a desiccator.

4.3.4 Color. Mix the components of the primer and the topcoat as specified in 4.3.7 and determine the color in accordance with ASTM D 1729 by applying the coatings on black and white hiding charts <sup>2/</sup> to full hiding. Allow to air dry for 24 hours and evaluate for compliance with 3.3.

<sup>1/</sup> Q Panel Company, Cleveland, OH, S-36 or equivalent.

<sup>2/</sup> Leneta Company, Ho-Ho-Kus, NJ, Form 2A or equivalent.



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4.3.5 Lead content. Determine the percent of lead in the primer and the topcoat by any of the following methods. Mix as specified in 4.3.7 and evaluate for compliance with 3.4.1.1.

4.3.5.1 Determination of lead by atomic absorption spectroscopy. Determine percent of lead in accordance with ASTM D 3335 on the mixed samples.

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

4.3.5.2.1 Test panel preparation. Using 100 grams of a known lead free primer and topcoat, 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 naphthenate of a known lead content. Thoroughly mix the aliquots to incorporate the lead and draw down the standards and coatings to be tested on duplicate black and white charts 2/ using a 0.0020 inch (0.004 inch gap clearance) film applicator. Air dry for 48 hours under dust free conditions. Cut the drawdowns into a suitable size and shape to fit the sample holder of the X-ray fluorescence spectrometer.

4.3.5.2.2 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:

$$R = \frac{I_{pb} - (I_{pb} \text{ background I} + I_{pb} \text{ background II})}{2 I_{\text{Compton line}}}$$

White 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 coatings 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.

4.3.6 Chromium (hexavalent) content.

a. Reagents:

- (1) 25 percent aqueous KOH.

b. Procedure:

- (1) Add 5 mL of 25 percent aq. KOH to 1/2 g of the extracted pigment contained in a 15 mL centrifuge tube.
- (2) Agitate by shaking the tube for a few minutes then centrifuge.

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- (3) The supernatant liquid should be colorless. A yellow color indicates presence of chromate.

4.3.7 Viscosity. Mix four parts, by volume, of component A with one part, by volume, of the appropriate component B for both primer and topcoat. Allow each mixture to stand for thirty minutes in sealed containers and measure viscosity according to ASTM D 562. Evaluate for compliance with table I. Make sure that components of the primer are not mixed with those of the topcoat.

4.3.8 Flash point. Mix samples as specified in 4.3.7 and determine flash points according to ASTM D 3278. Check for compliance with table I.

4.3.9 Drying time. Mix samples as specified in 4.3.7 and prepare drawdowns using a 0.004 inch (0.008 inch gap clearance) film applicator on a glass panel and air dry for the specified time. Check the drying time in accordance with ASTM D 1640 and evaluate for compliance with table I.

4.3.10 Condition in container.

4.3.10.1 Component A. For the primer and the topcoat, determine package condition of component A in accordance with FED-STD-141, method 3011 and observe for compliance with 3.6.1.1. Determine pigment settling by proceeding as specified in FED-STD-141, method 3011, but do not stir. Reseal and then agitate the cans for 3 minutes on a paint shaker <sup>3/</sup>. On reexamination of the contents, the disclosure of any gel bodies or undispersed pigment indicates unsatisfactory settling properties. Observe for compliance with 3.6.1.1.

4.3.10.2 Component B. For the primer and the topcoat, determine package condition of component B in accordance with FED-STD-141, method 4261 and observe for compliance with 3.6.1.2.

4.3.11 Storage stability.

4.3.11.1 Component A. Allow full quart cans of component A, primer and topcoat, to stand undisturbed for 12 months at 21 to 32 °C (70 to 90 °F) and then examine the contents. Evaluate the pigment settling as specified in 4.3.10.1 except agitate the can for 5 minutes on the paint shaker prior to reexamination. Determine viscosity and other applicable tests for compliance with 3.6.2.1.

4.3.11.2 Component B. Allow cans of component B, primer and topcoat, to stand undisturbed for 12 months at 21 to 32 °C (70 to 90 °F). At the end of this period, examine the contents in accordance with FED-STD-141, method 4261 for compliance with 3.6.2.2.

4.3.12 Mixing properties. Thoroughly mix 4 parts, by volume, of each component A with one part, by volume, of the appropriate component B. Place 150 mL of each mixed material in separate glass jars. Do not agitate or disturb for 4 hours. At the end of this period, examine with a spatula for compliance with 3.6.3.

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<sup>3/</sup> An apparatus of this type, powered by a 1/4 HP motor, operates at a rate of 1350 shakes per minute and is manufactured by Red Devil Tools, Irvington, NJ.

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4.3.13 Spraying properties. Mix the components of the primer and the topcoat as specified in 4.3.7 and spray each separately on steel panels to a dry film thickness of 0.003 to 0.004 inches according to FED-STD-141, method 4331. Allow to air dry for 24 hours and observe for compliance with 3.6.4.

4.3.14 Brushing properties. Mix the components of the primer and the topcoat as specified in 4.3.7 and brush each separately on metal panels according to FED-STD-141, method 4321. Allow to air dry for 24 hours and observe for compliance with 3.6.5.

4.3.15 Knife test. Panels used for this test shall be solvent cleaned and sand blasted with fresh sand to a smooth uniform appearance meeting SSPC-SP5. Spray the primer, mixed as specified in 4.3.7, on two 3 by 6 inch steel panels (sand blasted side), to a dry film thickness of 0.003 to 0.004 inches. Air dry the panels for 24 hours and spray them with the topcoat, mixed as specified in 4.3.7, to a dry film thickness of 0.003 to 0.004 inches. Total film thickness of the panels should be 0.006 to 0.008 inches. Air dry the panels for 7 days and perform the knife test according to FED-STD-141, method 6304 and observe for compliance with 3.6.6.

4.3.16 Pot life. Mix the components of the primer and the topcoat as specified in 4.3.7 and allow each to stand undisturbed for 4 hours. Measure viscosity according to ASTM D 562 and evaluate for compliance with 3.6.7.

4.3.17 Fuel and water resistance. Panels used for this test shall be solvent cleaned and sand blasted with fresh sand to a smooth uniform appearance meeting SSPC-SP5. Spray the primer, mixed as specified in 4.3.7, on three 3 by 6 inch steel panels (sand blasted side), to a dry film thickness of 0.003 to 0.004 inches. Air dry the panels for 24 hours and spray them with the topcoat, mixed as specified in 4.3.7, to a dry film thickness of 0.003 to 0.004 inches. Total film thickness of the panels should be 0.006 to 0.008 inches. Coat the backs and the edges of these panels in a similar manner. Air dry the panels for 7 days and immerse them in wide mouth glass jars, liter size, each containing 350 mL of JP-8 fuel conforming to MIL-T-83133 (Jet A-1 may be used in place of JP-8), and 350 mL of distilled water. Seal the jars and place in a water bath maintained at 51 to 53 °C (124 to 127 °F) for 21 days. At the end of the test period, remove and examine the panels for compliance with 3.6.8.

4.3.18 Adhesion. Use the panels that have been subjected to the fuel and water resistance test specified in 4.3.17. Allow to air dry for 24 hours and evaluate for adhesion according to ASTM D 3359, method B. Test areas of each panel that were exposed to JP-8 fuel and to distilled water. Observe for compliance with 3.6.9.

4.3.19 Impact resistance. Prepare panels as specified in 4.3.15 and test according to ASTM D 2794 using the 0.625 inch hemispherical head steel punch. Panels shall be subjected to a reverse impact of 10 inch pounds, the coating under test facing away from the punch. Observe for compliance with 3.6.10.

4.3.20 Contrast ratio. Mix the components of the primer and the topcoat as specified in 4.3.7 and determine the contrast ratio by making drawdowns on black and white hiding charts 2/ using a 0.004 inch (0.008 wide gap clearance) film applicator. Allow to air dry for 24 hours and determine the contrast ratio in accordance with ASTM D 2805. Evaluate for compliance with table I.

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4.3.21 Toxic ingredients. The manufacturer shall certify that the coatings contain no benzene, chlorinated compounds or ethylene based glycol ethers and their acetates. Nonconformance to 3.4.3 constitutes failure of this requirement.

4.4 Inspection of packaging. The preservation, packing and marking shall be examined for compliance with the quality assurance provisions of PPP-P-1892.

## 5. PACKAGING

5.1 Preservation, packing, and marking. Preservation, packing and marking shall be in accordance with the level A, B, or C requirements of PPP-P-1892 (see 6.2).

## 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 coating covered by this specification is intended for use on sand blasted interior surfaces of mobile and stationary mild steel cargo tanks and auxiliary handling equipment used for the storage and transportation of military fuels and oils without contributing to contamination of the cargo. It consists of a two-component yellow primer and a two-component white topcoat, each having a maximum VOC of not more than 2.8 pounds per gallon (340 grams/liter) at application.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. Kit size (or sizes) required (see 3.4 and 6.3).
- d. Level of preservation and packing required (see 5.1).

6.3 Basis of purchase. The coating covered by this specification should be purchased by volume, the unit being a kit comprised of a primer and a topcoat, each consisting of one quart of 57.75 cubic inches (component B) and one gallon of 231 cubic inches (component A).

6.4 Qualification. With respect to products requiring qualification, awards will be made only for such products which are, at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of contractor 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 the products covered by this specification. The activity responsible for the Qualified Products List is the U.S. Army Belvoir Research, Development and Engineering Center, ATTN: STRBE-VO, Fort Belvoir, VA 22060-5606, and Information pertaining to qualification of products may be obtained from that activity.

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6.5 Coating application. To insure adequate cure, the temperature of the substrate being coated should be above 10 °C (50 °F). The pot life of a mixed sample will be reduced by higher temperatures and increased by lower temperatures. To avoid solvent entrapment and a subsequent loss of resistance properties, there should be a minimum of 18 hours drying time between the primer and the topcoat, a total film thickness should be 0.006 to 0.008 inches.

6.6 Subject term (key word) listing.

Epoxy primer and topcoat  
 Fuel and water resistant  
 Lead and chromate free  
 Metal surfaces  
 Steel tank coating  
 VOC compliant

6.7 Changes from previous issue. Marginal notations 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  
 Air Force - 11  
 Navy - YD

Preparing activity:

Army - ME

Project No. 8010-0195

Review activity:

Air Force - 84

User activity:

Navy - SH

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

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<b>RECOMMEND A CHANGE</b>		1. DOCUMENT NUMBER MIL-C-4556E	2. DOCUMENT DATE (YYMMDD) 900914
3. DOCUMENT TITLE Coating Kit, Epoxy, for Interior of Steel Fuel Tanks			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME (Last, First, Middle Initial) [REDACTED]		b. ORGANIZATION [REDACTED]	
c. ADDRESS (Include Zip Code) [REDACTED]		d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	e. DATE SUBMITTED (YYMMDD) [REDACTED]
8. PREPARING ACTIVITY			
a. NAME [REDACTED]		b. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON	
c. ADDRESS (Include Zip Code) US Army Belvoir RDE Center ATTN: STRBE-TSE Ft. Belvoir, VA 22060-5606		(703) 664-5717 354-5717	
		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	