

NOT MEASUREMENT SENSITIVE
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MIL-C-81706  
AMENDMENT 6  
23 October 2000  
SUPERSEDING  
INT. AMENDMENT 5(AS)  
13 November 1979  
AMENDMENT 4  
10 March 1977

## MILITARY SPECIFICATION

### CHEMICAL CONVERSION MATERIALS FOR COATING ALUMINUM AND ALUMINUM ALLOYS

This amendment forms a part of MIL-C-81706, dated 30 June 1970, and is approved for use by all Departments and Agencies of the Department of Defense.

#### PAGE 1

##### 1.2.2.1: Add:

- \* “Form IV – Premixed liquid, thixotropic (ready for use)  
Form V – Premeasured powder, thixotropic (ready for use after addition of water)  
Form VI – Premixed liquid (ready for touch-up use in self-contained applicator device).”

#### PAGE 2

##### \* 1.2.2.2: Add:

“Method D – Applicator pen.”

##### \* 2.1: Under SPECIFICATIONS, Federal delete:

“L-B-560	Bottle, Screw Cap (Polyethylene)
TT-P-143	Paint, Varnish, Lacquer, and Related Materials, Packaging, Packing, and Marking of.”

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- \* 2.1: Under SPECIFICATIONS, Federal add:

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

2.1: Under SPECIFICATIONS, Military add:

- \* “MIL-B-26701 - Bottle, Polymer, in a Combination Container, Shipping and Storage, Air Eligible (Inactive for new design)
- \* MIL-PRF-85285 - Coating, Polyurethane, High-Solids
- \* MIL-PRF-85582 - Primer Coatings: Epoxy, Waterborne
- \* Change “MIL-P-23377” to “MIL-PRF-23377.”

PAGE 3

- \* Add new paragraph:

“2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents that 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 of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM-D3359 - Standard Test Methods for Measuring Adhesion by Tape Test

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)”

- \* 3.4: Delete the first sentence and substitute:

“3.4 Application. The material, when furnished in the form specified in 1.2.2.1, after proper mixing, shall allow treatment of the prepared metal in accordance with the supplier’s instructions, by spray, brush, immersion, or ready-to-use applicator pen. The applicator pen solution shall not be permitted to puddle.”

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- \* 3.4: Add to end of paragraph “Form IV and V films shall show an average weight of 2.8 to 6.5 grams of material adhering to panels tested in accordance with the method specified in 4.5.7.

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The material shall cling uniformly with no visual evidence of excessive run-off or lack of film coverage.”

\* Table I: Add “1/” after “336.”

\* Table I: At end of table add “1/ Exposure time for Class 1A, Form VI, Method D materials shall be 168 hours.”

PAGE 4

\* Add new paragraph:

“3.7.3 Adhesion (wet tape) after repair (Class 1A, Form VI, Method D only). After panel repair and immersion specified in 4.5.8, the scribed panels shall exhibit no peel away and be rated at not less than 4A in accordance with ASTM-D3359. There shall be no blistering of the unscribed coated area.”

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\* 3.10, delete the first sentence and substitute: “Materials conforming to this specification shall have a storage life of not less than 12 months.”

PAGE 6

4.3.2, line 5: Delete: “five gallons” and substitute “eight one-quart bottles.”

\* 4.3.2, line 7: After “(see 5.2.1).” add “For Class 1A, Form VI, Method D material, the supplier shall furnish 12 applicator pens.”

\* 4.3.3, line 6: After “width” add “, except those required for wet tape adhesion (panels 12 through 29) shall be 5 inches in length”

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After 4.3.3.1, add new paragraph:

“4.3.3.1.1 Panel preparation for adherence test. Three, 3 x 10 x 0.032 inch panels of 7075-T6 aluminum alloy shall be cleaned with toluene followed by acetone (3 x 0.032 inch x any length over 4 inches may be used). The panels shall then be marked with a pencil line 4 inches from one end. Each clean, marked panel shall be placed in a separate 600 ml beaker and weighed with the beaker to the nearest tenth of a gram.”

\* 4.3.3.2: Delete and substitute:

“4.3.3.2 Panel treatment for class 1A material. Panels of each alloy, lettered “A” and “B” detailed, marked, and cleaned in accordance with 4.3.3 and 4.3.3.1 shall be treated as follows:

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Class 1A, Form VI, Method D Panels – Panels shall be treated on one side by the qualifying activity in accordance with the supplier's instructions. All panels shall be dried at ambient conditions for 24 hours before finishing or testing. Panels marked 1 through 5 shall have edges protected by wax or other standard method.

All other panels – Panels shall be treated by the qualifying activity on all surfaces in accordance with the supplier's instructions. All panels shall be dried between 70 and 90 °F (21 and 32 °C) for 24 hours before finishing or testing, except those to be used for coating weight.”

4.3.3.3: Delete and substitute:

“4.3.3.3 Panel finishing for class 1A material. The A and B lettered panels numbered 7 through 29 in accordance with 4.3.3 shall be finished as follows:

Class 1A, Form VI, Method D (Panels 7 and 8) – Panels shall be finished with one coat of an epoxy primer conforming to MIL-PRF-23377 or MIL-PRF-85582. Panels shall be air dried for 14 days before testing.

Class 1A, Form VI, Method D (Panels 12 through 20) – Panels shall be finished with one coat of epoxy primer conforming to MIL-PRF-23377 followed by, after the primer has dried, a polyurethane topcoat conforming to MIL-PRF-85285. Panels shall be air dried for 14 days before testing.

Class 1A, Form VI, Method D (Panels 21 through 29) – Panels shall be finished with one coat of epoxy primer conforming to MIL-PRF-85582, followed by, after the primer has dried, a polyurethane topcoat conforming to MIL-PRF-85285. Panels shall be air dried for 14 days before testing.

All other panels – Panels shall be finished as specified in 4.3.3.3.1.”

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- \* Table II, under Class 1A Panel Nos., after “7 to 8” add “and 12 to 29.”
- \* Table II, under Reference paragraphs, after 4.5.3, add “and 4.5.8.”
- \* Table II, under Requirement paragraphs, after “3.7.2” add “3.7.3.”
- \* Table II, footnote 1/, after “respectively.” Add “Panels 12 through 29 are only required for Class 1A, Form VI, Method D materials.”
- \* Table II, under Tests, after “Coating Weight” add “6/.”
- \* Table II, under footnote 5/, add footnote “6/ Class 1A, Form VI, Method D materials are not subjected to coating weight test.”

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- \* 4.3.4.1, at end of paragraph add: “Class 1A, Form VI, Method D materials shall not undergo weight of film testing.”

Insert new paragraph after 4.3.6:

“4.3.7 Retention of qualification. In order to retain qualification of a product approved for listing on the Qualified Products List (QPL), the manufacturer shall 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 shall be in two-year intervals from the date of the original qualification, and shall be initiated by the qualifying activity. No change shall 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.”

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- \* Table III, under Test, after “Coating Weight” add “2/.”
- \* Table III, under footnote 1/, add footnote “2/ Class 1A, Form VI, Method D materials shall not be subjected to coating weight test.”

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Add new paragraphs after 4.5.6:

“4.5.7 Vertical adherence test. In addition to the other tests required for class 1A materials, Form IV and Form V shall be tested for ability to adhere to a vertical surface as specified in 3.4.

4.5.7.1 Material preparation. One quart of the Form IV or Form V material (with required water added) shall be thoroughly mixed and allowed to stand for 24 hours. Transfer enough of the material to almost fill a 600 ml plastic beaker.

4.5.7.2 Adherence. Each previously prepared panel, in accordance with 4.3.3.1.1, shall be immersed, one at a time, in the coating material up to the 4 inch pencil line, lifted vertically above the surface of the material and allowed to drain for 45 seconds. The panel shall then be transferred without rinsing to the beaker in which it was originally weighed and the beaker and the coated panel shall be re-weighed to the nearest tenth of a gram.

4.5.7.3 Weight of material clinging. The weight of material clinging to the panel is equal to the original weight of the panel plus the beaker subtracted from the weight of the panel plus the coating plus the beaker. Average weight determined from the three tests shall conform to 3.4.”

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\* Add new paragraphs:

“4.5.8 Adhesion (wet tape) after repair (Class 1A, Form VI, Method D only).

4.5.8.1 Repair procedure. Panels 12 through 29 finished as specified in 4.3.3.3 shall be abraded to a shiny substrate using a Scotch Brite wheel (see 6.8). The remainder of the topcoat shall be lightly abraded to accept refinish primer. The abraded area shall be 4 square inches. Class 1A, Form VI, Method D material shall be applied to the abraded panel and conditioned in accordance with the manufacturer's instructions. The entire surface of panels 12 through 20 and 21 through 29 shall be refinished as specified in the appropriate section of 4.3.3.3.

4.5.8.2 Immersion procedure. Painted panels shall be immersed in distilled water as follows:

3 panels of each substrate and finish for 24 hours at room temperature.

3 panels of each substrate and finish for 96 hours at  $120^{\circ} \pm 2^{\circ} \text{F}$  ( $49^{\circ} \pm 1^{\circ} \text{C}$ ).

3 panels of each substrate and finish for 168 hours at  $150^{\circ} \pm 2^{\circ} \text{F}$  ( $65.5^{\circ} \pm 1^{\circ} \text{C}$ ).

Upon completion of the immersion period, the panels shall be removed from the water, dried using a clean, dry soft cloth, and be immediately evaluated as specified in 4.5.8.3.

4.5.8.3 Evaluation procedure. Each panel shall be evaluated in accordance with Method A of ASTM-D3359 except for the following:

- a. There shall be one “X” scribed incisions between parallel lines that are approximately 1 inch apart. All incisions shall be into the substrate. The scribed area shall include the original paint, overlap area, and the repair area.
- b. The tape, 3M Type 250 (see 6.8), shall be placed on the panel parallel to the parallel scribed lines and be smoothed by rolling a 3 pound roller over it once. Tape removal shall be as specified in ASTM-D3359.
- c. The incision areas shall be inspected for peel away and the unscribed areas for blistering. Conformance to 3.7.3 shall be required.”

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5.2: Delete “Specification TT-P-143” and substitute: “PPP-P-1892.”

5.2.1, fourth sentence: Delete and substitute “Polyethylene bottles with polyethylene screw cap closures, conforming to MIL-B-26701, shall be used for packaging of premixed liquids for touch up brush application and for powder in quantities of 5 pounds or less.”

5.2.1, line 8: Delete “(see 6.2)” and substitute “and the premeasured powder shall be packaged in one quart quantities with the bottle marked with the powder level and the added liquid level (see 6.2).”

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- \* 6.1.1: Add to end of paragraph “Class 1A, Form VI, Method D materials covered by this specification are intended for use in the formation of chemical conversion coatings for repair or touch-up applications which are corrosion preventative and improve adhesion of paint finish systems to aluminum and aluminum alloys.”

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- \* 6.3.2, line 1: After “(Method B)” add “and pen application (Method D).”
- \* 6.8 Source of tape. Type 250 tape and Scotch Brite wheels are available for purchase from the 3M Company, Minneapolis, MN.

NOTE: The margins of the amendment are marked with an asterisk to indicate where changes from the previous amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of the document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

Army – MR  
Navy – AS  
Air Force – 99

Preparing activity:

Navy – AS

(Project MFFP-0674)

Review activities:

Army – AR, AT, MI  
Navy – OS, SH  
Air Force – 11  
Other – DS