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SUPERSEDING
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MILITARY SPECIFICATION

CLEANING COMPOUNDS, AIRCRAFT SURFACE

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

1. SCOPE

1.1 Scope - This specification covers the requirements for two classes of aircraft surface cleaning compounds.

1.2 Classification - The aircraft surface cleaning compounds covered by this specification shall be of the following classes, as specified (see 6.2).

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|----------|----------|
| Class 1 | -Liquid |
| Class 1A | -Aerosol |

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to extent specified herein:

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering Specifications and Standards Department (Code 93), Naval Air Engineering Center, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

NO AMSC NUMBER REQUIRED

FSC 6850

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SPECIFICATIONS

FEDERAL

| | |
|-------------|---|
| QQ-A-250/2 | -Aluminum Alloy 3003, Plate and Sheet |
| QQ-A-250/4 | -Aluminum Alloy 2024, Plate and Sheet |
| QQ-A-250/5 | -Aluminum Alloy Alclad 2024, Plate and Sheet |
| QQ-A-250/13 | -Aluminum Alloy Alclad 7075, Plate and Sheet |
| QQ-M-44 | -Magnesium Alloy Plate and Sheet (AZ31B) |
| QQ-P-416 | -Plating, Cadmium (Electrodeposited) |
| PPP-B-636 | -Boxes, Shipping, Fiberboard |
| PPP-C-96 | -Can, Metal, 28 Gage and Lighter |
| PPP-D-705 | -Drum, Shipping and Storage, Steel, 16 and 30 Gallon Capacity |
| PPP-D-729 | -Drum, Shipping and Storage, Steel, 55-Gallon (208 Liters) |
| PPP-P-704 | -Pail, Metal (Shipping, Steel, 1 Through 12 Gallon) |

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|-------------|--|
| MIL-M-3171 | -Magnesium Alloy, Processes for Pre-treatment and Prevention of Corrosion on |
| MIL-P-5425 | -Plastic, Sheet, Acrylic, Heat Resistant |
| MIL-L-6082 | -Lubricating Oil, Aircraft Reciprocating Engine (Piston) |
| MIL-S-7952 | -Steel, Sheet and Strip, Uncoated, Carbon (1020 and 1025) (Aircraft Quality) |
| MIL-C-8514 | -Coating Compound, Metal Pretreatment, Resin-acid |
| MIL-A-8625 | -Anodic Coatings, for Aluminum and Aluminum Alloys |
| MIL-T-9046 | -Titanium and Titanium Alloy, Sheet, Strip and Plate |
| MIL-L-19537 | -Lacquer, Acrylic-nitrocellulose Gloss (for Aircraft Use) |
| MIL-P-23377 | -Primer Coating, Epoxy-Polyamide, Chemical and Solvent Resistant |
| MIL-C-81762 | -Cleaner, Pressure, Cleaning Compound-Water, Foaming |
| MIL-C-83286 | -Coating, Urethane, Aliphatic Isocyanate, for Aerospace Applications |

STANDARDS

FEDERAL

| | |
|-------------|--|
| FED-STD-313 | -Material Safety Data Sheets, Preparation and Submission of |
| FED-STD-406 | -Plastic, Methods of Testing |
| FED-STD-791 | -Lubricant, Liquid Fuel and Related Products, Methods of Testing |

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|-------------|--|
| MIL-STD-105 | -Sampling Procedures and Tables for Inspection by Attributes |
| MIL-STD-129 | -Marking for Shipment and Storage |
| MIL-STD-147 | -Palletized Unit Loads |

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

2.2 Other publications - The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on the date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ANSI/ASTM D 95-70 (1975) Water in Petroleum Products and Bituminous Materials by Distillation

ANSI/ASTM D 98-77 Calcium Chloride

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

Test Procedure and Standards - ABS and LAS Biodegradability
Scientific and Technical Report No. 3

(Application for copies should be addressed to the Soap and Detergent Association, 485 Madison Avenue, New York, NY 10022.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies should be addressed to the National Motor Freight Traffic, Tariff Department, 1616 P Street, N.W. Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification Rules

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

CODE OF FEDERAL REGULATIONS

CFR Title 49, Parts 100-199

-Transportation

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

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Qualification. Cleaning compounds furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids. In addition, the retention of the cleaning compound on the applicable qualified products list shall be dependent on periodic verification of continued compliance with the requirements of this specification (see 4.3 and 6.3).

3.2 Composition. The composition of the cleaning compound shall be optional with the manufacturer but shall be restricted by the requirements of this specification. Although there is no water content requirement, the water content of the samples submitted or selected for quality conformance shall be within ± 3.0 percent of the water content of the manufacturer's original sample submitted and approved for qualification. Water content shall be determined as specified in 4.6.1.

3.2.1 Physical and chemical properties. The cleaning compound shall conform to the requirements of table I and 3.4 through 3.15 when tested as specified in 4.6.

3.3 Toxicity. The cleaning compound shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the acquiring activity to the appropriate medical service who will act as adviser to the acquiring activity. The manufacturer shall certify that the cleaning compound contains no substance known to be toxic to the user under normal conditions of use. Material safety data sheets shall be prepared and submitted in accordance with FED-STD-313, one copy of which shall be forwarded to the preparing activity of the specification.

3.4 Effect on painted surfaces. The cleaning compound shall cause no streaking, fading, or blistering of the aircraft paint systems and shall not cause a decrease of surface hardness greater than one pencil hardness; i.e., the hardness of the painted surface shall not be softer than the next softer pencil when tested in accordance with 4.6.7.

3.5 Stability.

3.5.1 High temperature stability. The cleaning compound shall not layer or separate after being exposed to a temperature of $60 \pm 2^{\circ}\text{C}$ ($140 \pm 3^{\circ}\text{F}$) for a period of six hours when tested in accordance with 4.6.8.1

3.5.2 Low temperature stability. The cleaning compound shall be homogeneous after being exposed to a temperature of $-18 \pm 5^{\circ}\text{C}$ ($0 \pm 9^{\circ}\text{F}$) for a period of one hour when tested in accordance with 4.6.8.2.

3.5.3 Hard water stability. The filtered cleaning compound when diluted with hard water shall show no separation when tested as specified in 4.6.8.3.

3.6 Emulsibility. The cleaning compound when mixed with water shall form a homogeneous emulsion and shall show no free solvent nor more than 2 ml of free water when tested as specified in 4.6.9.

3.7 Corrosiveness. Aluminum alloy, clad aluminum alloy, magnesium alloy, titanium alloy, polished aluminum alloy, steel and cadmium plated steel shall show no trace of corrosion when tested as specified in 4.6.10. Slight discoloration of the cadmium plated steel panels shall not be considered objectionable.

3.8 Effect on acrylic base plastics. The cleaning compound shall cause no crazing or cracking of stressed acrylic plastic when tested as specified in 4.6.11.

3.9 Cleaning ability. The cleaning compound shall remove at least 85 percent of the soil from at least 3 of the 4 panels when tested in accordance with 4.6.12. The cleaning compound shall remove at least 82 percent of the soil from the fourth panel.

3.10 Foaming properties. The compound shall produce a foam capable of clinging to vertical and underside surfaces of the panel when tested as specified in 4.6.13. The foam shall not break down in less than six minutes and not more than 80 ml of liquid shall be present after 6 minutes. The foam produced with foam generating equipment shall remain on all panels tested for at least 60 seconds. In case of doubt, comparison shall be made to control formula product (see table VI).

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3.11 Corrosion between the faying surfaces. There shall be no corrosion between faying surfaces of clad aluminum when tested as specified in 4.6.14.

3.12 Effect on salt-coated surfaces. The cleaning compound, when applied to a salt-coated surface, shall result in no non-rinsable film when tested as specified in 4.6.15.

3.13 Accelerated storage stability. The aged sample of cleaning compound shall show no marked change in color and uniformity, nor shall it pit, corrode or cause uneven darkening of steel surfaces, and shall give a soil removal value not less than 95 percent of that which is obtained with the unaged cleaning compound when tested in accordance with 4.6.16.

3.14 Storage stability. After storage for 6 months under the two conditions specified in 4.6.17, the cleaning compound shall not separate, crystallize or deteriorate, affect the metal strip, show any evidence of incompatibility, nor shall the pail show any evidence of distortion, leakage, or internal corrosion. The two stored cleaning compounds shall then meet the requirements of this specification for stability in hard water, rinsability and cleaning performance, except that the cleaning compound shall remove at least 80 percent of the soil from panels tested for cleaning performance.

3.15 Homogeneity. The cleaning compound, when allowed to stand undisturbed for 72 hours as specified in 4.6.18, shall be a clear liquid showing no separated solids or phase separation. A faint turbidity shall not be considered objectionable.

3.16 Leakage (class 1A). When the cleaning compound, packaged in pressurized cans, is tested as specified in 4.6.19, the cans shall not leak nor become distorted.

3.17 Net weight (class 1A). When tested for weight as specified in 4.6.20, the content of the pressurized can shall weigh a minimum of 13.0 ounces.

3.18 Performance (class 1A). The class 1A cleaning compound shall foam, adhere and clean at least as effectively as the control formula (see table VI) similarly packaged when both are tested in accordance with 4.6.21.

3.19 Composition (class 1A). The content of the pressurized can shall be composed of the following (see 4.6.22):

- | | | |
|----|-------------------|--|
| a. | cleaning compound | -92 percent (20 percent water solution of class 1) |
| b. | propellant | -8 percent A46 hydrocarbon (85 percent isobutane and 15 percent propane) |

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3.20 Service test. When required by the qualifying activity and when all the other qualification requirements have been met, the cleaning compound shall be tested as specified in 4.6.23 and shall show satisfactory performance in actual use.

3.21 Workmanship. When examined visually at room temperature, the cleaning compound shall be a homogeneous liquid free of foreign matter.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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.

4.1.1 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

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

- a. Qualification inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.2.1 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in the applicable paragraph of the specification.

4.3 Qualification inspection. The qualification inspection shall consist of the tests specified in table II and the examinations in 4.4.2.3 through 4.5.2.

4.3.1 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. The time of periodic verification by certification shall be in two-year intervals from the date of the original qualification. 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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4.3.2 Qualification samples. The qualification sample shall consist of 3 gallons of the cleaning compound. The gallon sample submitted for storage stability test shall be furnished in a 1-gallon pail conforming to PPP-P-704, type I, class 1. The samples shall be forwarded to the Supply Officer, Naval Air Development Center, Warminster, PA 18974, Attention: Director, Aircraft and Crew Systems Technology Directorate, Code 60622. The samples shall be plainly identified by securely attached durable tags or labels marked with the following information:

Sample for qualification inspection
 Cleaning Compound, Aircraft Surface
 Class
 Name of manufacturer
 Product code number
 Batch or lot number
 Date of manufacture
 Submitted by (name) (date) for qualification inspection
 in accordance with the requirements of Specification
 MIL-C-43616C under authorization of (reference authorizing
 letter (see 6.3))

4.3.2.1 Service test samples. Service test samples shall consist of 150 gallons of cleaning compound contained in thirty steel pails (5 gallons each) conforming to PPP-P-704, type I, class 3. No overpacking is required. Samples shall be forwarded in accordance with instructions contained in the authorizing letter granting service test which will be sent to the manufacturer on satisfactory completion of all laboratory tests.

4.3.2.2 Inspection report and other data. The contractor shall submit a test report, in duplicate, to accompany the qualification inspection sample. This report shall include the results of the manufacturer's tests, reported quantitatively, where applicable, in the units specified for all of the requirements specified herein. Tests not conducted due to lack of special test facilities or materials shall be so noted in the report. The contractor shall also furnish toxicological data necessary to evaluate the safety of the cleaning compound for the proposed use, and a certified statement specifically identifying each ingredient in the compound by a readily recognizable chemical name, source and percentage by weight. Trade names alone will not be considered satisfactory. The formulation shall be clearly identified by the manufacturer's formula number.

4.3.3 Qualification tests. The qualification tests of the cleaning compound shall consist of all the tests required under this specification.

4.4 Quality conformance inspection. The quality conformance inspection of the cleaning compound shall consist of all the examinations and tests required under this specification except storage stability and service test.

4.4.1 Lot formation. A lot shall consist of all the cleaning compound produced by one manufacturer, at one plant, from the same materials, and under essentially the same conditions provided the operation is continuous and does not exceed a 24 hour period. In the event the process is a batch operation, each batch shall constitute a lot (see 6.4).

4.4.2 Quality conformance test samples. Quality conformance test samples shall be selected in accordance with table III. Unless otherwise specified and with the exception of 4.6.19 through 4.6.22, two 1-gallon composite samples consisting of equal parts of the sample units selected shall be subjected to the tests specified in 4.6. The pressurized containers shall be tested as specified in 4.6.19 through 4.6.22. There shall be no test failures when the sample is tested as specified in 4.6. The contractor shall retain in his possession and available for inspection for each lot a certified test report showing that the lot conforms to the specification.

4.4.2.1 Inspection. Sampling for inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated hereinafter.

4.4.2.2 Inspection of materials and components. The contractor is responsible for insuring that materials and components used were manufactured, tested and inspected in accordance with the requirements of referenced subsidiary specifications and standards to the extent specified, or if none, in accordance with this specification.

4.4.2.3 Inspection of the end item. Inspection of the end item shall be as specified in 4.4.2.3.1 and 4.4.2.3.2.

4.4.2.3.1 Visual examination. The sample unit for this examination shall be one filled unit container. The content shall be examined for the defects listed below. The samples for this examination shall be selected at random in accordance with MIL-STD-105, inspection level S-3 and acceptable quality level (AQL) 2.5 defects per hundred units.

Examine

Defect

Material

Not as specified.

Appearance

Presence of foreign matter.

Not homogeneous.

4.4.2.3.2 Net content. The sample unit for this examination shall be one filled container. The sample size shall be as specified in table III. The lot shall be unacceptable if the average net content per con-

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tainer for all units examined is less than specified. The volume shall be corrected to 15.6°C (60°F).

4.5.2 Packaging inspection.

4.5.2.1 Examination for packaging and marking. An examination shall be made to determine that packaging, packing and marking comply with the requirements of Section 5 of this specification. Defects shall be scored in accordance with the list below. The sample unit for this examination shall be one shipping container fully prepared for delivery except that it shall not be palletized and need not be sealed. Shipping containers fully prepared for delivery that have not been palletized shall be examined for defects of closure. The lot size shall be the number of shipping containers in the end item inspection lot. The samples for this examination shall be selected at random in accordance with MIL-STD-105, inspection level S-2 and acceptable quality level (AQL) 4.0 defects per hundred units.

Examine

Defect

Packaging

Container not as specified, closures not accomplished by specified or required methods or materials. Leakage or seepage of contents. Non-conforming component, component missing, damaged or otherwise defective. Bulged or distorted container.

Markings

Data, including directions for use, omitted, illegible, incorrect, incomplete, or not in accordance with contract requirements.

4.5.2.2 Examination for palletization. An examination shall be made to determine that palletization complies with the requirements of Section 5 of this specification. Defects shall be scored in accordance with the list below. The sample unit shall be one palletized unit load fully prepared for delivery. The lot size shall be the number of palletized unit loads in the end item inspection lot. The samples for this examination shall be selected at random in accordance with MIL-STD-105, inspection level S-1 and acceptable quality level (AQL) 6.5 defects per hundred units.

Examine

Defect

Finished dimension

Length, width, or height exceeds specified maximum requirement.

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| | |
|---------------|---|
| Palletization | Not as specified. Pallet pattern not as specified. Interlocking of loads not as specified. Load not bonded with required straps as specified. |
| Weight | Exceeds maximum load limits. |
| Marking | Omitted, incorrect, illegible, of improper size, location, sequence or method of application. |

4.6 Test methods.

4.6.1 Water content. The water content of the cleaning compound shall be determined in accordance with ANSI/ASTM D 95-70(1975).

4.6.2 pH value. A 25 percent solution of the cleaning compound shall be prepared with distilled water at 25°C (77°F). The pH of both the concentrated cleaning compound and the 25 percent solution in distilled water shall be determined using a pH meter with a high alkali resistant glass electrode.

4.6.3 Insoluble matter. The test sample, after having been stored undisturbed for at least one week, shall be thoroughly agitated and two 100 gram samples withdrawn and weighed to the nearest 1 gram. The insoluble matter shall be collected with the aid of a vacuum filtering apparatus capable of producing 200 - 250 mm of vacuum (water tap filter pump), a 250 ml filtering flask, a .25 cm Buchner funnel and two pieces of filter paper (Whatman No. 1 or equivalent). Two filter papers for each determination shall be dried at $60 \pm 2^{\circ}\text{C}$ ($140 \pm 3^{\circ}\text{F}$) for 30 minutes and cooled in a desiccator and then weighed to the nearest 1 mg. Two filter papers shall be placed in the Buchner funnel, the vacuum started and the test sample filtered. The sides of the sample container shall be rinsed with 25 ml of the filtrate and the rinse mixture transferred to the funnel. The sides of the funnel shall be rinsed with an additional 25 ml of the filtrate and the liquid filtered. The filtrate shall be removed and saved for the stability test specified in 4.6.8.3. The vacuum shall be maintained for an additional five minutes. The filter papers shall then be dried for one hour at $60 \pm 2^{\circ}\text{C}$ ($140 \pm 3^{\circ}\text{F}$) and cooled in a desiccator and weighed to the nearest 1 mg. The percent insolubles shall be calculated as follows:

$$\text{Percent insolubles} = \frac{(A_2 - B_2) - (A_1 - B_1)}{\text{Weight of sample}} \times 100$$

A_1 = initial weight of top filter paper.

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B_1 = initial weight of bottom filter paper.

A_2 = final weight of top filter paper.

B_2 = final weight of bottom filter paper.

4.6.4 Non-volatile matter content. The non-volatile matter content of the cleaning compound shall be determined in duplicate. The accurate tare weight of a clean, glass petri dish (15 mm deep and 90 mm in diameter) shall be determined. Two grams \pm 0.5 g of the cleaning compound, accurately determined by difference in weight, shall be poured into the dish from a weighing bottle. The cleaning compound shall be placed in a convection oven at $105 \pm 5^\circ\text{C}$ ($221 \pm 9^\circ\text{F}$) for 16 hours. The dish and residue shall be cooled in a desiccator and weighed. The percent of non-volatile matter shall be calculated.

4.6.5 Flash point. The flash point of the cleaning compound shall be determined in accordance with method 1101 of FED-STD-791.

4.6.6 Biodegradability. The contractor shall submit for biodegradability a notarized certificate of compliance signed by a responsible official of the company. The certificate shall include the test procedure utilized in making the biodegradability determination. When the detergent is an alkyl benzene sulfonate or a linear alkylate sulfonate, the biodegradability shall be determined in accordance with the ABS and LAS Biodegradability Scientific and Technical Report No. 3.

4.6.7 Effect on painted surfaces.

4.6.7.1 Preparation of pencils. A set of drawing pencils (see 6.5) shall be prepared for testing the painted panels by stripping the wood, approximately 3/8 inch, away from the end without damaging the lead (see figure 1). The tip of the lead shall then be squared by holding the pencil in a vertical position and moving the lead back and forth over a very fine (180 grit) sandpaper. The tip of the lead shall be squared after each trial.

4.6.7.2 Preparation of panels. Six 3 by 6-inch panels shall be prepared from aluminum alloy conforming to QQ-A-250/4 and anodized in accordance with MIL-A-8625. Corners and edges shall be smoothed. The panels shall then be cleaned with a solution containing 40 ml of n-butyl alcohol, 30 ml of isopropyl alcohol, 20 ml of water and 10 ml of 85 percent orthophosphoric acid. After cleaning, the panels shall be rinsed with distilled water and air-dried. The panels shall be coated with one coat (0.0002-0.0003 inch) of coating conforming to MIL-C-8514. Two panels shall then be finished with each paint system as specified in table IV.

4.6.7.3 Test procedures. The test panels, prepared in accordance with 4.6.7.2, shall be placed in a horizontal position. A 25 percent

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solution of the cleaning compound in distilled water shall be applied to approximately one-half the area of each panel and shall be allowed to remain on the panels for 15 minutes. The panels shall then be rinsed with distilled water and allowed to air-dry for 24 hours. Examine for streaking, fading or blistering of the finish. The hardness of the treated and untreated areas shall be determined in the following manner: Pencils of decreasing hardness shall be held by hand at a 45-degree angle (see figure 1) and pushed across the paint film with a firm uniform pressure until a pencil is found that will not cut the film but will leave a black mark on the surface; whereas, the next harder pencil will cut through the film without leaving a black mark. The hardness number of the pencil that cuts the film shall express film hardness.

4.6.8 Stability. The high temperature, low temperature and hard water stability tests shall be performed on the undiluted cleaning compound.

4.6.8.1 High temperature stability. Fifty ml of the sample shall be placed in a 50-ml graduated cylinder and stoppered. The cylinder shall be placed in a water bath at $60 \pm 2^{\circ}\text{C}$ ($140 \pm 3^{\circ}\text{F}$) and maintained at that temperature for 6 hours. At the end of the 6-hour period, remove the cylinder from the water bath. Allow the cylinder to cool to room temperature and examine the sample for separation or layering. The water bath shall be of sufficient depth to cover 32 ± 2 ml of the compound.

4.6.8.2 Low temperature stability. Approximately 50 ml of the sample shall be poured into a suitable size test tube and cooled to $-18 \pm 5^{\circ}\text{C}$ ($0 \pm 9^{\circ}\text{F}$). This temperature shall be maintained for one hour. The compound shall then be allowed to reach room temperature. After five inversions of the test tube, the compound shall be examined for homogeneity.

4.6.8.3 Hard water stability.

4.6.8.3.1 Preparation of stock solution. A 10 grain hard water stock solution shall be prepared by dissolving 0.20 ± 0.005 g of analytical reagent calcium acetate, $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot \text{H}_2\text{O}$ and 0.14 ± 0.005 g of analytical reagent magnesium sulfate, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, in 1 liter of boiled distilled water.

4.6.8.3.2 Procedure. Five ml of the filtered cleaning compound (see 4.6.3) shall be added to each of three clean 50-ml graduated cylinders. Forty-five ml of synthetic hard water shall be added to each of the graduated cylinders and mixed well. These solutions shall be allowed to stand for 16 hours at a temperature of $25 \pm 5^{\circ}\text{C}$ ($77 \pm 9^{\circ}\text{F}$) after which time they shall be examined for separation.

4.6.9 Emulsibility. Ten ml of cleaning compound shall be placed in a 50-ml glass-stoppered graduated tube and 40 ml of distilled water

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shall be slowly added. After 60 seconds, the tube shall be slowly inverted once, then allowed to stand for 60 seconds and examined for homogeneity. If a homogeneous emulsion does not form, the cleaning compound is unsatisfactory. If a homogeneous emulsion forms, the tube shall be shaken thoroughly and allowed to stand undisturbed for 48 hours. At the end of the 48-hour period, the contents of the tube shall be examined for solvent on top and water at the bottom.

4.6.10 Corrosiveness.

4.6.10.1 Test panels. Test specimens shall consist of 1 by 6 inch panels of aluminum alloy conforming to QQ-A-250/4 and anodized to conform to MIL-A-8625, type I or II; clad aluminum alloy conforming to QQ-A-250/13; clad aluminum alloy conforming to QQ-A-250/5; magnesium alloy conforming to QQ-M-44, cleaned and treated with MIL-M-3171, type VI; titanium alloy, 6AL-4V, conforming to MIL-T-9046; polished aluminum alloy conforming to QQ-A-250/4; steel conforming to MIL-S-7952 and steel conforming to MIL-S-7952 cadmium plated in accordance with QQ-P-416. The panels, prior to being subjected to the test, shall be cleaned by boiling for 1 minute in CP isopropyl alcohol and 1 minute in CP mineral spirits.

4.6.10.2 Procedure. Five hundred ml of a 10 percent by volume solution of the cleaning compound in distilled water shall be placed in a 1000-ml tall form beaker. The panels described above shall then be placed on end in the solution without touching each other, and allowed to stand for 1 hour at a temperature of $25 \pm 5^{\circ}\text{C}$ ($77 \pm 9^{\circ}\text{F}$). Wetting of the upper surfaces of the panels shall be avoided. After 1 hour immersion, the panels shall be removed and allowed to air-dry in an upright position for 3 hours. The panels shall then be re-immersed in the solution for 1 minute, removed, and allowed to air-dry for 24 hours. The panels shall be rinsed, and then visually examined for corrosion by comparing the unexposed surfaces of the panels with the surfaces previously immersed.

4.6.11 Effect on acrylic plastics.

4.6.11.1 Apparatus. Test panels shall be fabricated from acrylic base plastic sheet conforming to MIL-P-5425 and to the dimensions specified in method 6053 of FED-STD-406. A cantilever test rack of the type described therein shall be constructed for use in this procedure.

4.6.11.2 Procedure. Three plastic test panels shall be annealed by suspending in an oven maintained at $90 \pm 2^{\circ}\text{C}$ ($194 \pm 4^{\circ}\text{F}$) for 2 hours. At the end of the annealing period, the temperature of the test panels shall be reduced to room temperature at the rate of $27 \pm 5^{\circ}\text{C}$ ($49 \pm 9^{\circ}\text{F}$) per hour maximum. The annealed test panels shall be conditioned at room temperature for at least 7 days before use. Each of the three test panels shall be set up as a cantilever beam under load as described in method 6053 of FED-STD-406. The panels shall then be loaded by means of weights or lead shot bags to produce a stress of 2000 pounds per square inch (psi). The

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load necessary to produce this stress may be determined by use of the following formula:

$$P = \frac{Sbd^2}{6L}$$

Where:

S = 2000 = stress in pounds per square inch.

P = load in pounds.

L = distance in inches from fulcrum to point at which load is applied.

b = width of plastic sheet 1/.

d = thickness of plastic sheet 1/.

1/ Measured by means of a micrometer to within 0.0001 inch.

After 10 minutes, the test panels shall be examined to insure that no crazing has occurred prior to cleaning compound application. While test panels are still under stress, a 1 by 2 inch piece of flannel cloth shall be placed on the top surface of the panel with its long axis parallel to that of the panel and centered over the fulcrum. The flannel shall be wet (using a medicine dropper) with 2 ml of a 10 percent dilution of the compound. The flannel shall be kept wet by applying an additional milliliter of cleaner each hour for 4 hours. At the end of 6 hours, while the panels are still under stress, the flannel cloth shall be removed and the panel inspected for crazing by passing a light under the loaded end of the panel and observing panel at the fulcrum from above. The appearance of bright refractory lines parallel to the fulcrum is evidence of crazing. Lines less than 1/8 inch in length touching the sheared edges of the test panel shall be disregarded.

4.6.12 Cleaning ability.

4.6.12.1 Preparation of soiling mixture. The soiling mixture shall be prepared prior to testing and shall have the composition shown in table V.

4.6.12.2 Preparation of test panels. Twenty eight \pm 4 mil thick aluminum panels conforming to QQ-A-250/2 shall be fluted as specified in figure 2. The panels shall have eight indentations per inch and the hollows shall be 3 ± 1 mil deep. Degrease the panels by immersing them in boiling mineral spirits followed by separate rinses in ethyl alcohol and acetone. Dry the panels in an oven maintained at $105 \pm 2^\circ\text{C}$ ($221^\circ \pm 4^\circ\text{F}$).

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for 1/2 hour. The panels shall then be removed from the oven, cooled to room temperature and weighed to the nearest 0.1 mg. The soiling mixture shall be maintained at $24 \pm 1^{\circ}\text{C}$ ($75 \pm 2^{\circ}\text{F}$) during the soiling procedure. A dipping machine similar to the Fisher-Payne Dipcoater (see 6.6) shall be used to give a uniform coating of soil. The panel should be immersed to the shoulder in 15-20 seconds and removed in approximately 70 seconds. The panels shall be air-dried at room temperature for one hour and then baked in an oven at $121 \pm 3^{\circ}\text{C}$ ($250 \pm 5^{\circ}\text{F}$) for 1 hour. The panels shall then be cooled to room temperature and weighed to the nearest 0.1 mg. Only panels having dry pickup of 25 to 30 mg shall be used.

4.6.12.3 Apparatus. The apparatus shall be capable of completely immersing and removing the panel vertically at a rate of 20 ± 1 cycles per minute for the wash and rinse test (see figure 3).

4.6.12.4 Soil removal. Three hundred ml of cleaning compound shall be added to 2700 ml of distilled water and mixed thoroughly. The emulsion should be maintained at $24 \pm 1^{\circ}\text{C}$ ($75 \pm 2^{\circ}\text{F}$) throughout the test. Two soiled panels shall be simultaneously immersed and withdrawn from the cleaning solution at a rate of 20 ± 1 cycles per minute for a period of 15 minutes. The panels shall then be rinsed for 60 ± 1 seconds in distilled water using the same equipment and procedure. The panels shall then be dried for 1 hour at $105 \pm 2^{\circ}\text{C}$ ($221 \pm 4^{\circ}\text{F}$) and reweighed. Calculate the percent soil removal as follows:

$$\text{Percent soil removal} = \frac{\text{Weight of soiled panel} - \text{weight of cleaned panel}}{\text{Weight of soiled panel} - \text{weight of unsoiled panel}} \times 100$$

Four panels shall be used for this test.

4.6.13 Foaming properties. One part of the undiluted cleaning compound shall be mixed with 9 parts distilled water. One hundred ml of this mixture shall be placed in a Waring blender or equivalent. The blender shall be turned on for 2 minutes at 8000 ± 1000 cycles per minute. (After 2 minutes, a stabilized foam in excess of 400 ml shall be in the blender with no liquid detected at bottom.) A stabilized foam is indicated by negligible agitation at the upper surface. The blender shall be turned off after 2 minutes, and after 6 minutes sitting time, less than 80 ml of liquid shall be present at the bottom of container. If foam breaks down in less than 6 minutes or if more than 80 ml of liquid are present after 6 minutes, the cleaning compound is unsatisfactory. If the compound passes this test, it shall be tested in the equipment specified in MIL-C-81762. The first application shall be made to an aluminum panel 24 by 24 inches from a hose having an inside diameter of 1 inch and 50 to 75 feet in length with the dilution ratio set at 1 part compound to 10 parts water. The second application shall be made to a similar panel with a hose having an inside diameter of 3/4 inch and 25 feet in length with dilution set at 1 part compound to 10 parts water. The panels shall be

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held at an angle of 60 degrees to the horizontal. The aluminum panels shall be used in two forms:

- a. unpainted.
- b. painted in accordance with designation B of table IV.

4.6.14 Corrosiveness between faying surfaces.

4.6.14.1 Preparation of test panels. Test panels, 3 by 6 inches, shall be prepared as follows: one set shall be prepared using alclad 7075 conforming to QQ-A-250/13 and the other using alclad 2024 conforming to QQ-A-250/5. Each set shall consist of two 3 by 6 by 0.02-inch sheets of similar stock clamped together by means of wire paper clips (70 percent overlap).

4.6.14.2 Test procedure. Each set of panels shall be placed in a horizontal position and 5 ml of a 10 percent solution of the cleaning compound in distilled water shall be poured on the faying edge and allowed to react for 10 minutes. Each set of panels shall then be rinsed for 1 minute by pouring 200 ml of distilled water on the faying edge. The panels shall then be placed vertically on a rack and allowed to stand for 5 days. The panels shall then be separated, brushed, rinsed and examined visually for corrosion on the faying surfaces.

4.6.15 Effect on salt coated surfaces.

4.6.15.1 Test panels. The panels used in this test shall conform to panel A described in table IV.

4.6.15.2 Synthetic sea water. This solution shall have the composition shown in table VII and shall be made with distilled water.

4.6.15.3 Procedure. The panels shall be placed in a horizontal position, lacquered surface up, and sprayed with the synthetic sea water (see 4.6.15.2). An atomizer paint spray gun or equivalent may be used for this operation. The panels shall be thoroughly covered by sea water droplets and dried under an infrared lamp. The salt coated panels shall then be partially immersed in a glass tray approximately 5 by 8 inches which contains 150 ml of a 10 percent by weight solution of the cleaning compound in distilled water. The panels shall be tilted from the horizontal in such a manner that only half of the panel is beneath the surface of the solution. The panels shall be soaked in this manner for 1 minute without agitation, then removed and allowed to drain in an upright position for 1 minute. They shall then be dried under the infrared lamp. The panels shall then be rinsed in a moderate stream of distilled water until the salt

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on the portion of the panel that has not been submerged in the cleaning solution appears to have been dissolved. The panel shall then be dried under the infrared lamp. The presence of a residue shall then be determined by visual comparison of the immersed and nonimmersed halves of the panel.

4.6.16 Accelerated storage stability.

4.6.16.1 Preparation of test sample. A 5-ounce portion of well shaken cleaning compound shall be poured into each of two chemically clean 12-ounce pressure resistant clear glass bottles which shall be approximately 9-1/2 inches in height, 2-1/2 inches in outside diameter. One bottle shall be capped and stored in the dark for at least 6 days at room temperature. A strip of steel, 6 by 0.5 by 0.02 inches, conforming to MIL-S-7952 shall be polished to remove surface contamination and then cleaned by boiling for 1 minute in CP isopropyl alcohol and 1 minute in CP mineral spirits. The steel strip shall be placed in the other test bottle and the bottle shall be capped.

4.6.16.2 Procedure. The capped bottle containing the steel strip shall be placed in an oil bath and heated at a uniform rate to a temperature of $60 \pm 2^{\circ}\text{C}$ ($140 \pm 4^{\circ}\text{F}$) over a period of 5 hours. It shall be held at this temperature for 3 hours. No heat shall be applied to the bath overnight. The above heating procedure shall be repeated each day for 5 days. (This test need not necessarily be attended if an interval timer is used to regulate the temperature automatically. The test may be started on a Wednesday, Thursday or Friday and still have the pressure bottle removed on a normal workday). On the morning of the sixth day, the bottle shall be removed from the bath, uncapped and the steel strip carefully withdrawn from the cleaning compound. The portion of the steel strip which had been immersed in the compound shall be examined for evidence of pitting, corrosion and uneven darkening. The part of the strip above the surface of the compound shall also be examined for evidence of pitting, corrosion and uneven darkening. The open bottle shall be capped and the two bottles shall be thoroughly shaken for 1 minute, then allowed to remain undisturbed for 1 hour at room temperature and then examined. Any marked change in the color and uniformity of the aged sample shall be considered as showing unsatisfactory stability properties. If there is no change in the aged sample and it passes the corrosion requirement, the product shall be tested for cleaning ability (see 4.6.12). One liter of a 10-percent dilution may be used for this cleaning test. The soil removal must be determined and the results be compared with the original results.

4.6.17 Storage stability. The one gallon metal pail conforming to PPP-P-704, type I, class 1, filled with cleaning compound furnished for the stability test shall be stored for 6 months at $49 \pm 3^{\circ}\text{C}$ ($120 \pm 5^{\circ}\text{F}$). In addition, one gallon of the cleaning solution shall be placed in a glass container to which has been added a cleaned and polished metal strip

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conforming to MIL-S-7952. The total surface area of both sides of the steel strip shall be 6 ± 0.5 square inches. After expiration of the 6 month period, the pail shall be examined for distortion and leakage. The metal strip shall be examined for evidence of corrosion. The compound from each container shall be examined for separation and crystallization and tested for conformance to hard water stability (4.6.8.3), cleaning ability (4.6.12) and effect on salt coated surfaces (4.6.15). The top of the container shall be removed and the internal surface examined for corrosion and sediment. Discoloration of the interior surface of the container shall be disregarded.

4.6.18 Homogeneity. The cleaning compound shall be allowed to stand undisturbed for a minimum of 72 hours. It shall then be examined for clarity, separated solids, phase separation and turbidity.

4.6.19 Leakage (class 1A). A pressurized can containing cleaning compound shall be immersed completely for five minutes in water maintained at $54 \pm 2^\circ\text{C}$ ($130 \pm 3^\circ\text{F}$). The can shall be observed for emission of bubbles or distortion during the test period.

4.6.20 Net weight (class 1A). A pressurized can shall be weighed. The cleaning compound shall be sprayed for three minutes, followed by a one minute pause. This procedure shall be repeated until the can is empty. The empty can shall then be reweighed and the weight of the content calculated.

4.6.21 Performance (class 1A). Panels prepared as described in 4.6.12.2 shall be used. The sample shall be sprayed on the soiled panel. The control formula (see table VI), packaged as described in 5.1.1.1, shall be sprayed on the second panel. The time for the foam to collapse shall be compared. The panels shall be brushed with a soft bristle brush and rinsed with tap water. The cleaned panels shall be compared.

4.6.22 Composition (class 1A). A contractor's notarized certificate of compliance signed by a responsible official of the company is acceptable for the composition of class 1A.

4.6.23 Service test. The service test, performed by an activity designated by the activity responsible for qualification, shall consist of a field evaluation of the sample under service conditions, conducted with standard operational procedures on two or more aircraft, selected at random, to determine suitability of the cleaning compound for military use. The class 1 material shall be service tested using foam generating equipment conforming to MIL-C-81762. In case of dispute, comparison shall be made to the control formula product (see table VI).

5. PACKAGING

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5.1 Packaging. Packaging shall be level A or minimum protection, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Class 1A. Unless otherwise specified in the contract or order, class 1A cleaning compound shall be packaged in 16-oz pressurized containers conforming to type IX, class 2 of PPP-C-96. All internal surfaces of the container shall be lined with a material that will not affect nor be affected by the cleaning compound. The valve shall be equal or equivalent in performance to Newman-Green No. R-10-123 with a 6-3/16 inch stem. The activator head shall be equal or equivalent in performance to Newman-Green No. 150-25-18. The containers shall conform to applicable requirements of the Code of Federal Regulations, Title 49, Parts 100-199.

5.1.1.2 Class 1. Class 1 of the cleaning compound shall be furnished in 5, 15 or 55-gallon unit quantities as specified (see 6.2). Unless otherwise specified in the contract or order, the 5-gallon, 15-gallon, and 55-gallon quantities shall be packaged in containers which conform to type I, class 3 of PPP-P-704; type II of PPP-D-705 and type II of PPP-D-729, respectively. The 5-gallon pail shall have a 2-inch threaded closure. The flanges shall have three or more full threads and plugs shall have sufficient lengths of thread that three or more full threads are engaged when the plug is screwed tight with gaskets in place. Threads shall be American Standard modified pipe thread. The internal surfaces of all containers shall be lined with a material that will not affect nor be affected by the cleaning compound.

5.1.1.3 Intermediate packaging. Twelve containers, packaged as specified in 5.1.1.1, shall be packaged in a fiberboard box conforming to PPP-B-636, type CF, class domestic, style RSC, grade 200. The 12 cans, arranged 3 in width and 4 in length, shall fit snugly in the fiberboard box, and each unit shall be nested in a snug fitting, full-height, half-slotted style partition. The box and the partition shall be made of the same material. The box closure shall be in accordance with the appendix of the box specification.

5.1.2 Minimum protection.

5.1.2.1 Commercial. The cleaning compound shall be packaged in specified quantities in a manner that will afford adequate protection to prevent damage during shipment under environmental conditions utilizing containers required by the Code of Federal Regulations, Title 49, Parts 100-199.

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

5.2.1 Level A. Two intermediate packages, packaged as specified in 5.1.1.3, shall be packed in a snug fitting fiberboard box conforming to

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PPP-B-636, class weather resistant and taped in accordance with the appendix. The cleaning compound, when packaged in 5, 15 or 55-gallon quantities as specified in 5.1.1.2, shall require no overpacking. Standard 4-way entry pallets are required for handling by mechanical equipment.

5.2.2 Level B. Two intermediate packages, packaged as specified in 5.1.1.3, shall be packed in a snug fitting fiberboard box conforming to PPP-B-636, class domestic and tape sealed in accordance with the appendix. The cleaning compound, when packaged in 5, 15 or 55-gallon quantities as specified in 5.1.1.2, shall require no overpacking. Standard 4-way entry pallets are required for handling by mechanical equipment.

5.2.3 Minimum protection.

5.2.3.1 Commercial. The packaged cleaning compound shall be packed in shipping containers in a manner that will afford adequate protection, at the lowest rate, against damage during direct shipment from the supply source to the first receiving activity. The containers used shall conform to the rules and regulations of the mode of transportation utilized.

5.3 Palletization. Unless otherwise specified (see 6.2), cleaning compound packed in 5 gallon quantities as specified in 5.1.1.2, shall be palletized in accordance with load type III of MIL-STD-147, except that for overseas shipment, the over-all height of the load shall not exceed 43 inches. Each prepared load shall be bonded with primary, secondary and horizontal straps in accordance with means K, L and E and shall have storage aid 5 applied.

5.4 Marking. In addition to any special marking required by the contract or order, shipping containers and palletized unit loads, when applicable, shall be marked in accordance with MIL-STD-129. The marking on each container shall include the pH of the cleaning compound. The marking on the pressurized container shall also include the following:

CAUTION

Content under pressure.

Do not puncture or incinerate.

Use with adequate ventilation. 1/

Do not store above 49°C (120°F).

Avoid prolonged or repeated breathing of vapors 1/.

1/ Shall also be added to the container markings for all classes.

5.4.1 Directions for use. The following directions for use marking shall appear on each container in which class 1 is supplied:

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1. Heavy duty cleaning - Dilute 1 part concentrate with 4 parts water.
2. Normal cleaning - Dilute 1 part concentrate with 9 parts water.
3. Light duty cleaning - Dilute 1 part concentrate with 16 parts water.

5.4.2 Handling. Wear goggle-type eye glasses and solvent resistant gauntlet style gloves, aprons, and boots.

APPLICATION

Class 1 - Rinse aircraft with fresh water on all areas to be cleaned. Apply cleaner by spray, mop, sponge, brush or foam generator and allow to remain on surface 5 to 10 minutes. Scrub with brush or mop. Rinse thoroughly with stream of water.

Class 1A - Rinse aircraft with fresh water (when available) on all areas to be cleaned. When water is not available or low temperature precludes its use, wipe the areas to be cleaned. Apply the cleaner by spraying. Allow it to remain on the surface for 3 to 6 minutes and scrub with a brush. Rinse the surface thoroughly with a stream of water, when available. When water is not available or low temperature precludes its use, wipe the material from the surface.

DO NOT ALLOW COMPOUND TO DRY BEFORE RINSING AS STREAKING AND LESS EFFECTIVE CLEANING WILL RESULT. DO NOT USE UNDILUTED.

6 NOTES

6.1 Intended use. The cleaning compound is intended for cleaning painted and unpainted aircraft surfaces. Class 1A is intended to be used on areas less accessible and more difficult to clean using existing procedures.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Class of cleaning compound required (see 1.2).
- c. Quantity of cleaning compound desired.
- d. Type and capacity of container required (see 5.1.1.2).
- e. Selection of applicable levels of packaging and

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- packing (see 5.1 and 5.2)
 f. When palletization is not required (see 5.3).

6.2.1 Unit of purchase. The unit of purchase for the cleaning compound is the U.S. gallon. A U.S. gallon of liquid occupies 231 cubic inches at 15.6°C (60°F).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products Lists whether or not such products have actually been so listed by that date. The attention of the suppliers 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 Naval Air Systems Command, Department of the Navy, Washington, D.C. 20361; however, information pertaining to qualification of products may be obtained from the Director, Aircraft and Crew Systems Technology Directorate, Code 60622, Naval Air Development Center, Warminster, PA 18974.

6.4 Batch. A batch is defined as that quantity of material which has been manufactured by some unit chemical process and subjected to some physical mixing operation intended to make the final product substantially uniform.

6.5 Drawing pencils. A set of Venus drawing pencils manufactured by the American Pencil Company (6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, and 6H) is known to be satisfactory.

6.6 Dipcoater. Fisher-Payne Dipcoater may be obtained from Fisher Scientific Company, 203 Fisher Building, Pittsburg, PA 15219.

6.7 Cross-reference of classifications. The classification under this revision differs from that of the previous revision as follows (see 1.2):

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Class 1 - Liquid

Class 1 A - Aerosol

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Class 1 - For use in foam generators

Class 1 A - Class 1 packaged in pressurized containers

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6.8 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Navy - AS

Air Force - 68

Army - GL

Preparing Activity:

Navy - AS

(Project No. 6850-0666)

Review activities:

Army - AV, MR, MD, EA

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TABLE I. Physical and chemical properties.

| Characteristics | Requirements | |
|---|--------------|------|
| | Min. | Max. |
| pH value at 25°C | 8.0 | 10.0 |
| Insoluble matter, percent | -- | 0.1 |
| Nonvolatile matter, percent | 21.0 | -- |
| Tag closed cup flash point, °F | 142 | -- |
| Biodegradability of surfactant present, percent | 90 | -- |

TABLE II. Qualification inspection

| Inspection | Requirement paragraph | Test method paragraph |
|---------------------------------|-----------------------|-----------------------|
| Water | 3.2 | 4.6.1 |
| Acidity (pH) | Table I | 4.6.2 |
| Insoluble matter | Table I | 4.6.3 |
| Nonvolatile matter | Table I | 4.6.4 |
| Flash point | Table I | 4.6.5 |
| Biodegradability | Table I | 4.6.6 |
| Effect on painted surfaces | 3.4 | 4.6.7 |
| High temperature stability | 3.5.1 | 4.6.8.1 |
| Low temperature stability | 3.5.2 | 4.6.8.2 |
| Hard water stability | 3.5.3 | 4.6.8.3 |
| Emulsibility | 3.6 | 4.6.9 |
| Corrosiveness | 3.7 | 4.6.10 |
| Effect on acrylic base plastics | 3.8 | 4.6.11 |
| Cleaning ability | 3.9 | 4.6.12 |
| Foaming properties | 3.10 | 4.6.13 |
| Corrosion (faying surfaces) | 3.11 | 4.6.14 |
| Effect on salt-coated surfaces | 3.12 | 4.6.15 |
| Accelerated storage stability | 3.13 | 4.6.16 |
| Storage stability | 3.14 | 4.6.17 |
| Homogeneity | 3.15 | 4.6.18 |
| Leakage (class 1A) | 3.16 | 4.6.19 |
| Net Weight (class 1A) | 3.17 | 4.6.20 |
| Performance (class 1A) | 3.18 | 4.6.21 |
| Composition | 3.19 | 4.6.22 |
| Service test | 3.20 | 4.6.23 |

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TABLE III. Net content.

| Lot size (containers) | Sample size (containers) |
|-----------------------|--------------------------|
| Up to 50 | 5 |
| 51 - 500 | 7 |
| 501 - 35,000 | 8 |
| 35,001 and over | 11 |

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TABLE IV. Test panel finishes.

| Panel designation | Processing steps | Material | Number of coats | Thickness per coat | Drying time between coats | Drying time after final coat |
|-------------------|------------------|--|-----------------|--------------------|---------------------------|--------------------------------|
| A | 1 | Primer coating epoxy polyamide MIL-P-23377 | 1 | 0.5 - 1.0 mil | 1 hour at room temp. | --- |
| | 2 | Lacquer Acrylic-nitrocellulose Gloss MIL-L-19537 | 2 | 0.7 - 1.0 mil | 1 hour at room temp. | 72 hours |
| B | 1 | Primer coating epoxy polyamide MIL-P-23377 | 1 | 0.6 - 0.9 mil | 1 - 2 hours at room temp. | --- |
| | 2 | Coating Urethane aliphatic isocyanate glossy white MIL-C-83286 | mist coat | --- | 15 min at room temp. | --- |
| | 3 | Coating Urethane aliphatic isocyanate glossy white MIL-C-83286 | wet coat | 1.5 - 2.5 mil | --- | Air dry one week at room temp. |

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TABLE V. Soiling mixture.

| Ingredients | Specification or grade | Parts by weight |
|---------------------|-------------------------------------|-----------------|
| Xylene | -- | 200 |
| Lubricating oil 1/ | MIL-L-6082 grade 1100 (oxidized) | 200 |
| Colloidal silica 2/ | Grade 1160 | 4 |

1/ Concentrated to 30 percent of original weight using heat.

2/ Manufactured by the Illinois Mineral Co., Chicago, IL 62934.

TABLE VI. Control formula

| Ingredients | Percent by weight |
|---|-------------------|
| Water | 20.8 |
| Tetrapyropotassium phosphate | 2.5 |
| Sodium metasilicate ($\text{Na}_2 \text{SiO}_3 \cdot 5\text{H}_2\text{O}$) | 0.7 |
| Potassium chromate | 0.1 |
| Ethylene glycol monobutyl ether | 5.0 |
| Potassium hydroxide (45 percent by weight) | 4.2 |
| Oleic acid | 8.3 |
| (Mix above ingredients in the order given. Check pH. Adjust the pH to 9.0 ± 0.5 with potassium hydroxide or oleic acid, if required.) | |
| Solvesso 150 | 41.7 |
| Cyclohexanol | 2.8 |
| Monoethanolamine | 6.7 |
| Dodecyl benzene sulfonic acid (98%) | 7.2 |
| (Adjust pH to 8 - 11 with potassium hydroxide, if necessary.) | |

Table VII. Synthetic sea water.

| Constituent | Grade or specification | Grams per liter |
|---|------------------------|-----------------|
| Sodium chloride (NaCl) | Technical | 50.0 |
| Magnesium chloride ($\text{MgCl}_2 \cdot 2\text{H}_2\text{O}$) | Technical | 22.0 |
| Calcium chloride ($\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$) | ANSI/ASTM D 98-77 | 3.2 |
| Sodium sulfate (Na_2SO_4) | Technical | 8.0 |

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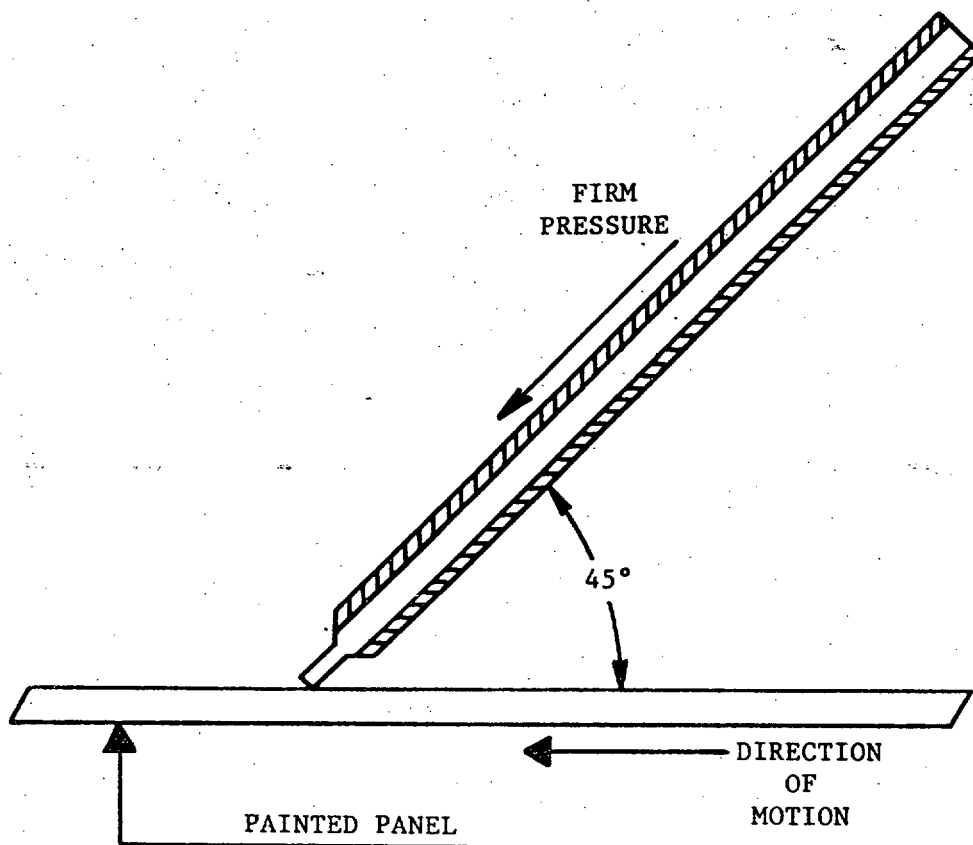
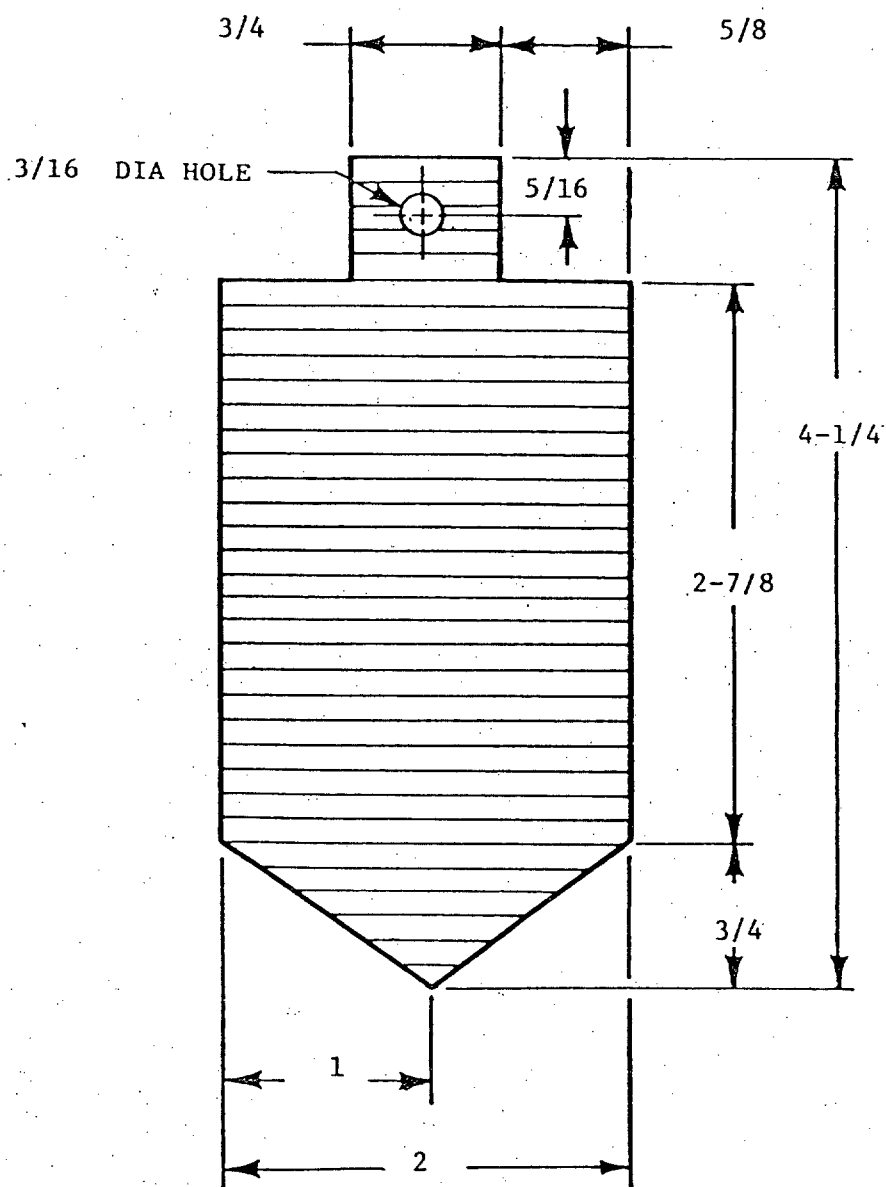


FIGURE 1. Test for hardness of painted surface.

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NOTE: (1) Dimensions in inches
(2) Tolerance - 0.01

FIGURE 2. Fluted aluminum panel for cleaning ability test.

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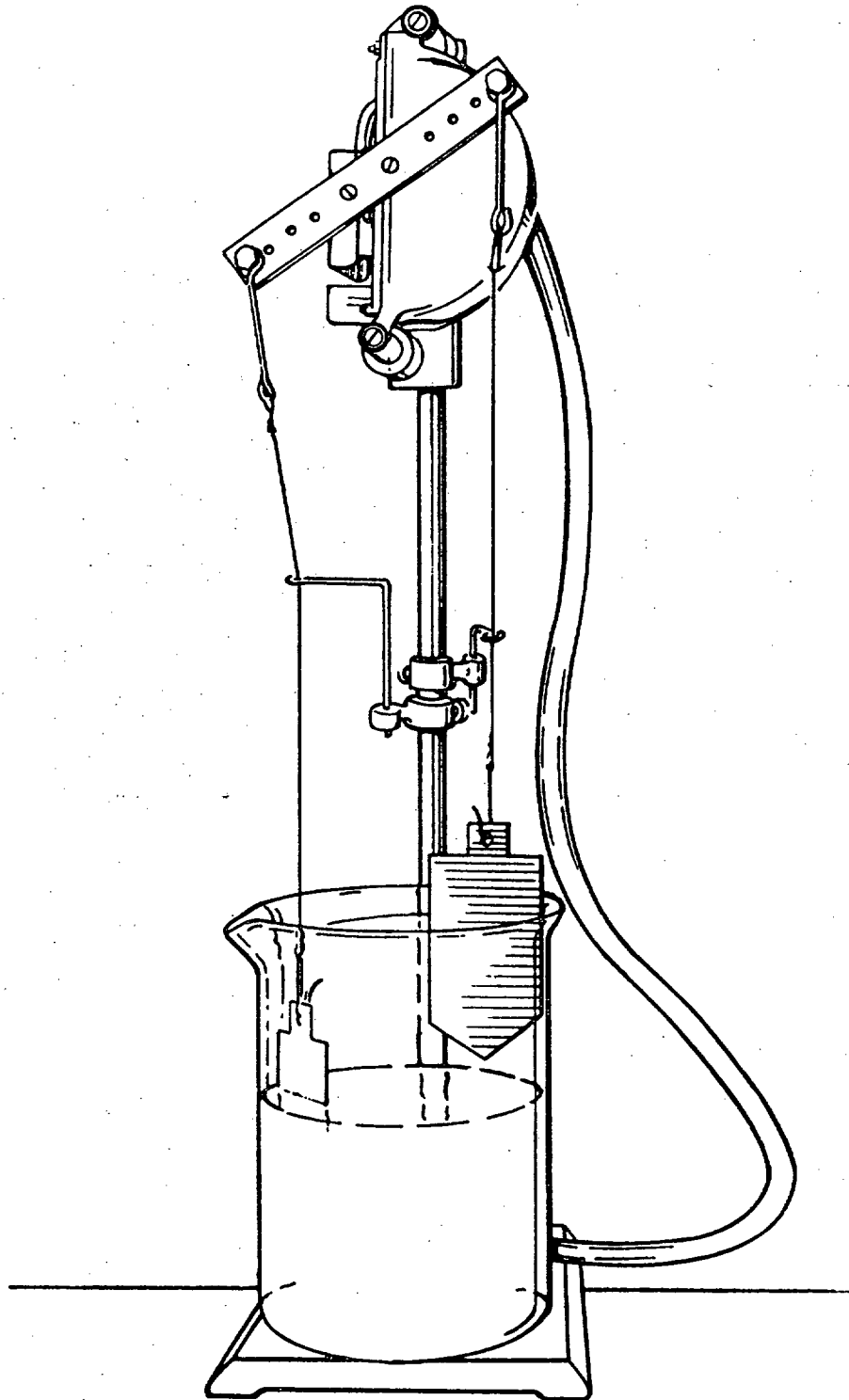


FIGURE 3. Apparatus for soil removal.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

| | | | |
|---|--|---|--|
| 1. DOCUMENT NUMBER | | 2. DOCUMENT TITLE | |
| 3a. NAME OF SUBMITTING ORGANIZATION | | 4. TYPE OF ORGANIZATION (Mark one) | |
| b. ADDRESS (Street, City, State, ZIP Code) | | <input type="checkbox"/> VENDOR | |
| | | <input type="checkbox"/> USER | |
| | | <input type="checkbox"/> MANUFACTURER | |
| | | <input type="checkbox"/> 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) | |
| | | | |

DO NOT DETACH THIS FORM. CUT ALONG THIS LINE.