

MIL-C-85570B
26 August 1987
SUPERSEDING
MIL-C-85570A(AS)
28 March 1983

MILITARY SPECIFICATION
CLEANING COMPOUND, AIRCRAFT,
EXTERIOR

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

1. SCOPE

1.1 Scope. The cleaning compounds covered by this specification are used for cleaning the exterior surface of aircraft.

1.2 Classification. The cleaning compounds covered by this specification shall be of the following types, as specified (see 6.2):

- Type I - General use (contains aromatic solvent)
- Type IA - General use aerosol (contains aromatic solvent)
- Type II - General use (contains no aromatic solvent)
- Type III - Abrasive spot cleaner (for high gloss paint surfaces)
- Type IV - Rubberized spot cleaner (for tactical paint scheme surfaces)
- Type V - Gel-type degreaser

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Systems Engineering and Standardization Department (Code 53), Naval Air Engineering Center, Lakehurst, NJ 08733-5100, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 6850

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SPECIFICATIONS

FEDERAL

QQ-A-250/13	-	Aluminum Alloy Alclad 7075, Plate and Sheet
QQ-P-416	-	Plating, Cadmium (Electro-deposited)
PPP-B-636	-	Boxes, Shipping, Fiberboard
PPP-C-96	-	Can, Metal, 28 Gage and Lighter
PPP-P-704	-	Pail, Metal (Shipping, Steel, 1 through 12 Gallons)
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)

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MIL-C-1164	-	Cloth, Terry, Cotton
MIL-M-3171	-	Magnesium Alloy, Processes for Pretreatment and Prevention of Corrosion on
MIL-S-7952	-	Steel, Sheet and Strip, Uncoated, Carbon (1020 and 1025) (Aircraft Quality)
MIL-T-9046	-	Titanium and Titanium Alloy, Sheet, Strip and Plate
MIL-I-19537	-	Lacquer, Acrylic-nitrocellulose Gloss (For Aircraft Use)
MIL-G-21164	-	Grease, Molybdenum Disulfide, for Low and High Temperatures
MIL-P-23377	-	Primer Coating, Epoxy Polyamide, Chemical and Solvent Resistant
MIL-C-81309	-	Corrosion Preventive Compound, Water Displacing Ultra Thin Film
MIL-W-81381/11	-	Wire, Electric, Fluorocarbon/polyimide Insulated, Medium Weight, Silver Coated Copper Conductor, 600 Volts, Nominal 8, 4 or 15.4 Mil Wall
MIL-H-83282	-	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft, NATO Code Number H-537
MIL-C-83286	-	Coating Urethane, Aliphatic Isocyanate, for Aerospace Applications
MIL-C-83957	-	Cleaning and Polishing Pad, Non-metallic (for Aircraft)

STANDARDS

FEDERAL

FED-STD-313	-	Material Safety Data Sheet Preparation and the Submission of
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MILITARY

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

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

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

CODE OF FEDERAL REGULATIONS

29 CFR 1910.1200 -	Material Safety Data Sheet; Preparation and submission of
40 CFR -	Protection of Environment
49 CFR 100-199 -	Transportation

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

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.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 56 -	Flash Point by Tag Closed Tester
ASTM D 95 -	Water in Petroleum Products & Bituminous Materials by Distillation
ASTM D 2834 -	Nonvolatile Matter (Total Solids) in Water-Emulsion Floor Polishes, Solvent-Based Floor Polishes, and Polymer-Emulsion Floor Polishes
ASTM E 203 -	Water Using Karl Fischer Reagent
ASTM F 483 -	Total Immersion Corrosion Test for Aircraft Maintenance Chemicals

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- ASTM F 484 - Stress Cracking of Acrylic Plastics in Contact with Liquid or Semi-Liquid Compounds
- ASTM F 485 - Effects of Cleaners on Unpainted Aircraft Surfaces
- ASTM F 502 - Effects of Cleaning and Chemical Maintenance Materials on Painted Aircraft Surfaces
- ASTM F 519 - Mechanical Hydrogen Embrittlement Testing of Plating Processes and Aircraft Maintenance Chemicals

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

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

- AMS 4377 - Magnesium Alloy, Sheet and Plate - 3.0 Al 1.0 Zn Cold Rolled, Partially Annealed
- ARP 1512 - Corrosion of Aluminum Alloys by Aircraft Maintenance Chemicals, Sandwich Test

(Application for copies should be addressed to SAE, 400 Commonwealth Drive, Warrendale, PA 15096.)

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

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. Cleaning compounds 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 4.3 and 6.3).

3.2 Material. The material covered by this specification shall be a product consisting of a mixture of ingredients which produce a satisfactory item. The cleaning compound shall contain no known or suspected human carcinogens or heavy metals. The cleaning compound shall contain no Total Toxic Organic (TTO) compounds as defined in 40 CFR.

3.2.1 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 contracting activity to the appropriate departmental medical service who will act as adviser to the contracting agency. The manufacturer at time of qualification shall certify

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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, and shall meet the requirements of 29 CFR 1910.1200. When FED-STD-313 is at variance with the CFR, 29 CFR 1910.1200 shall take precedence, modify and supplement FED-STD-313. One copy of the Material Safety Data Sheet shall be forwarded to the preparing activity of the specification and one copy to the qualifying laboratory.

3.3 Composition. The composition of the cleaning compound shall be optional with the manufacturer but shall be restricted by the requirements of this specification. The cleaning compound shall conform to the requirements of Table I when tested in accordance with the applicable paragraph of section 4. Neither Type I nor Type II cleaning compounds shall contain phosphates or polyphosphates. Type IV and V cleaning compounds shall contain a green or blue-green dye similar in intensity to the Type IV and V control formulas respectively.

3.3.1 Compositional assurance. The cleaning compound shall be tested for water content and non-volatile content as specified in 4.6.4. Results of these tests as well as an infrared spectrogram of the non-volatile matter shall be recorded by the qualifying activity for use in quality conformance inspections. Quality conformance inspection results shall not differ from the recorded values by more than 3 percentage points for water content or by more than 2 percentage points for non-volatile matter. No significant difference in infrared spectrograms shall be evident.

3.3.2 Rubber content (Type IV only). The cleaning compound shall contain 10.0 to 15.0 percent by weight of particulate rubber, such as B. F. Goodrich Hycar 1422 or equivalent.

3.3.3 Consistency (Types IV and V only). When tested as specified in 4.6.21, Type IV cleaning compound shall flow between 10 and 20 centimeters in 10 seconds, and Type V cleaning compound shall flow between 13 and 23 centimeters in 10 seconds respectively.

3.3.4 Sprayability (Type V only). Cleaning compound (Type V) shall produce a uniform spray and shall deposit as a uniform layer on a vertical surface when tested in accordance with 4.6.22.

3.4 Corrosion of metal surfaces.

3.4.1 Sandwich corrosion. When tested in accordance with 4.6.5, the cleaning compound shall not cause a corrosion rating greater than 1 on any test panel.

3.4.2 Total immersion corrosion. When tested in accordance with 4.6.5, the cleaning compound shall not show evidence of corrosion nor cause a weight change of any specimen greater than that specified in Table II.

3.5 Hydrogen embrittlement. The cleaning compound, when tested in accordance with 4.6.6 (using ASTM F 519 type 1d specimens), shall show no evidence of hydrogen embrittlement. In addition, when tested in accordance with ASTM F 519, type 2a specimens shall show no evidence of hydrogen embrittlement.

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3.6 Effect on painted surfaces. The cleaning compound shall cause no streaking, fading or blistering of the aircraft paint system, and shall not cause a decrease of surface hardness greater than one pencil hardness when tested as specified in 4.6.7.

3.7 Effect on unpainted surfaces. When tested as specified in 4.6.8, the cleaning compound shall produce no streaks or stains which require polishing to remove.

3.8 Effect on salt-coated surfaces. When tested as specified in 4.6.9, the cleaning compound shall produce no nonrinsable film when applied to a salt-coated surface.

3.9 Effect on acrylic plastics. The cleaning compound shall not craze acrylic plastics when tested as specified in 4.6.10.

3.10 Effect on polyimide wire. The cleaning compound, when tested as specified in 4.6.11, shall not cause cracking, discoloration, dissolution, breakdown or leakage of the polyimide insulated wire in excess of that produced by distilled water.

3.11 Abrasiveness (Type III and IV only). The Type III cleaning compound shall not reduce the gloss of polyurethane paint (color number 17875) by more than 10.0 percent, when tested as specified in 4.6.12. The Type IV cleaning compound shall not increase the gloss of polyurethane paint (color number 36440 or 36495) by more than 0.5 gloss units, when tested as specified in 4.6.12.

3.12 Cleaning ability.

3.12.1 Types I, II and IV. The cleaning compound shall exhibit cleaning efficiencies equal to or better than the corresponding control formulas when used to clean each of three soils prepared from hydraulic fluid (MIL-H-83282), molybdenum disulfide grease (MIL-G-21164), and wire rope lubricant (Sprayon No. 201 or equivalent), as specified in 4.6.13.2.

3.12.2 Type III. The cleaning compound shall completely remove embedded carbon black, when tested as specified in 4.6.13.3.

3.12.3 Type V. The cleaning compound shall remove corrosion preventive compound (MIL-C-81309) and wire rope lubricant (Sprayon No. 201 or equivalent) as well as or better than the corresponding control formula, when tested as specified in 4.6.13.4.

3.13 Stability.

3.13.1 Accelerated storage stability. The cleaning compound shall not separate or discolor, nor shall it pit, corrode or cause discoloration of steel surfaces when tested as specified in 4.6.14.1. In addition, the aged compound shall give a cleaning ability value not less than 90 percent of that obtained with the unaged compound when tested as specified in 4.6.14.1. Particulate matter in the Type III and Type IV cleaners shall not settle or float appreciably.

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3.13.2 Low temperature stability. The cleaning compound shall remain homogeneous after low temperature exposure as specified in 4.6.14.2.

3.13.3 Hard water stability (Types I and II only). The cleaning compound shall mix with hard water to form a clear solution and shall exhibit no clouding or separation when tested in accordance with 4.6.14.3.

3.13.4 Storage stability. After storage as specified in 4.6.14.4, the cleaning compound shall not separate, crystallize or deteriorate; not corrode or darken the metal strip, not show any evidence of incompatibility with its container, or show any evidence of distortion, leakage or internal corrosion of the container. In addition, the stored cleaning compound shall then give a cleaning ability value not less than 90 percent of that obtained with unaged compound when tested in accordance with 4.6.13.

3.14 Foaming properties (Types I and II only). The cleaning compound, when tested as specified in 4.6.15, shall produce a stabilized foam which shall not break down nor produce more than 80 milliliters of liquid after standing for 6 minutes. The foam produced with foam generating equipment shall cling to vertical and underside panel surfaces and shall remain on all panels tested for not less than 60 seconds.

3.15 Leakage (Type IA). When the cleaning compound, packaged in pressurized cans, is tested as specified in 4.6.16, the cans shall not leak nor become distorted.

3.16 Net weight (Type IA). When tested for weight as specified in 4.6.17, the content of the pressurized can shall weigh a minimum of 13 ounces.

3.17 Performance (Type IA). The Type IA cleaning compound shall adhere and clean at least as effectively as the Type I control formula diluted to 20 percent by volume (see 4.6.13.1) when both are tested in accordance with 4.6.18.

3.18 Composition (Type IA). The pressurized can shall contain cleaning compound diluted to 20 percent by volume, a propellant consisting of monochlorodifluoromethane and a vapor pressure reducer such that the can pressure at 70°F is less than 60 psi. When sprayed over a bunsen burner flame the spray from the can shall not exhibit flame extension.

3.19 Service evaluation. Service tests, when required by the qualifying activity, shall be initiated upon completion of all laboratory tests. Cleaning compound shall be tested as specified in 4.6.20 and shall show satisfactory performance in actual use.

3.20 Workmanship. The cleaning compound shall be a liquid having a uniform and homogeneous appearance. The component ingredients shall be intimately blended and processed as required in accordance with the best commercial practice for a high quality material.

4. QUALITY ASSURANCE PROVISIONS

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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.

4.1.1 Responsibility for compliance. All items must 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. When 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. Standard conditions shall be a temperature of $22 \pm 2^{\circ}\text{C}$ ($72 \pm 4^{\circ}\text{F}$) and a relative humidity of 50 ± 20 percent. All tests shall be conducted at standard conditions unless otherwise specified herein.

4.3 Qualification inspection. The qualification inspection shall consist of the tests in Table III and the inspections in 4.4.2.3 and 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 original qualification and shall be initiated by the qualifying activity. 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.

4.3.2 Qualification samples. Each qualification sample shall consist of two 1-gallon containers of cleaning compound furnished in a 1-gallon pail conforming to PPP-P-704, Type I, Class 1. One gallon of each sample shall be used for the storage stability test. Samples submitted under Type IA shall consist of six aerosol spray cans. The samples shall be plainly identified by securely attached durable tags or labels marked with the following information:

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Sample for qualification inspection
CLEANING COMPOUND, AIRCRAFT, EXTERIOR

Type

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 MIL-C-85570B under authorization of (reference authorizing letter) (see 6.3)

4.3.2.1 Service test samples. Service test samples shall consist of five 5-gallon pails each of Types I, II, IV and V, two cases of twenty four cans each of Type IA, and five 1-gallon containers of Type III cleaning compound. The cleaning compound shall be packaged and shipped in accordance with the requirements of section 5 of this specification. 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 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. The manufacturer shall certify the biodegradability of each surfactant contained in the cleaning compound in accordance with methods appropriate to the type of surfactant and shall reference the method used. The manufacturer shall also certify the content (by weight percent) of aromatic solvent (for all Types) and of rubber (for Type IV only). When submitting a Type IA sample the manufacturers shall certify that the can contents meets the composition requirement of 3.18, and shall specify the construction of the can, sprayhead and valve. In addition the manufacturer of Type IA aerosol cans shall specify the name and address of the aerosol packager.

4.4 Quality conformance inspection. The quality conformance inspection of the cleaning compound shall consist of all the examinations and tests specified in Table IV. Additionally, the quality conformance inspection shall also include water content, non-volatile content, and an infrared spectrogram of the non-volatile matter.

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 V. Unless otherwise specified, two 1-gallon composite samples, consisting of equal parts of the

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sample units selected, shall be subjected to the tests specified in Table IV. There shall be no test failures when the sample is tested as specified in 4.6. The contractor shall submit with 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 as otherwise specified herein.

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 an acceptable quality level (AQL) of 2.5 defects per hundred units.

<u>Examine</u>	<u>Defect</u>
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 (see 6.2.1). The sample size shall be as specified in Table V. The lot shall be unacceptable if the average net content per container 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 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 an AQL of 4.0 defects per hundred units.

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<u>Examine</u>	<u>Defect</u>
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 an AQL of 6.5 defects per hundred units.

<u>Examine</u>	<u>Defect</u>
Finished dimension	Length, width, or height exceeds specified maximum requirement.
Palletization	Not as specified. Pallet pattern not as specified. Interlocking of loads not as specified. Load not banded 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. Tests shall be conducted in accordance with the conditions specified in 4.2.1.

4.6.1 pH value. A 10 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 10 percent solution in distilled water shall be determined using a pH meter with a high alkali resistant glass electrode.

4.6.2 Insoluble matter. The test sample shall be thoroughly agitated and two 100 gram samples withdrawn and weighed to the nearest 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 4.25 cm Buchner funnel and two pieces of filter paper (Whatman no. 1 or equivalent). Two filter papers for each determination

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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 milligram. 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 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:

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

where:

A_1 = initial weight of top filter paper.

B_1 = initial weight of bottom filter paper.

A_2 = final weight of top filter paper.

B_2 = final weight of bottom filter paper.

4.6.3 Flash point. The flash point of Types I and II shall be determined in accordance with ASTM D 56. Types III, IV, and V shall use ASTM D 95.

4.6.4 Compositional assurance.

4.6.4.1 Non-volatile content. Non-volatile content shall be determined in accordance with ASTM D 2834 using a 16 hour oven time. Sample weights shall be 2-3 grams and a 100 mm diameter glass Petri dish should be used.

4.6.4.2 Water content. Water content (in percent by weight) shall be determined in accordance with ASTM E 203.

4.6.4.3 Solvent content total. Solvent content (in percent by weight) shall be determined by difference using the following equation:

$$\text{Solvent content, total (percent by weight)} = 100 - W - NV$$

Where W = water content, as determined in 4.6.4.2
 NV = non-volatile content, as determined in 4.6.4.1

4.6.5 Corrosion tests. The corrosion tests shall be performed with the cleaning compound concentrations as follows:

- Type I - as received
10% by volume in distilled water
- Type II- as received
10% by volume in distilled water
- Type III-as received
- Type IV- as received
- Type V - as received

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4.6.5.1 Total immersion corrosion. The cleaning compound shall be tested in accordance with ASTM F 483. Test duration shall be 168 hours.

4.6.5.2 Sandwich corrosion. The cleaning compound shall be tested in accordance with ARP 1512 using the following test coupons:

2024 - T3 - Aluminum alloy QQ-A-250/4
2024 - T3 - Aluminum alloy QQ-A-250/5

7075 - T6 - Aluminum alloy QQ-A-250/12
7075 - T6 - Aluminum alloy QQ-A-250/13

4.6.6 Hydrogen embrittlement. The hydrogen embrittlement shall be determined in accordance with ASTM F 519 using type 1d specimens, except that the specimens shall be immersed for 1 hour in the as-received cleaning compound, then be removed and permitted to hang notched side down, in air for 99 hours. In addition type 2a specimens shall be tested in accordance with ASTM F 519.

4.6.7 Effect on painted surfaces. The effect on painted surfaces shall be determined in accordance with ASTM F 502, except that the painted surface of the panels shall be prepared as specified in Table VI. Cleaning compound concentrations shall be as follows:

Type I	10% dilution in distilled water
Type II	10% dilution in distilled water
Type III	As received
Type IV	As received
Type V	As received

4.6.8 Effect on unpainted surfaces. The effect on unpainted surfaces shall be determined in accordance with ASTM F 485.

4.6.9 Effect on salt-coated surfaces.

4.6.9.1 Test panels. The panels used in this test shall conform to panel B described in Table VI.

4.6.9.2 Synthetic sea water. This solution shall have the composition specified in Table VII and shall be made with distilled water.

4.6.9.3 Procedure. The panels shall be placed in a horizontal position, painted surface up, and sprayed with the synthetic sea water. An atomizer, paint spray gun or equivalent may be used for this operation. When the panels are thoroughly covered by sea water droplets, the panels shall be dried in a $38 \pm 2^\circ\text{C}$ ($100 \pm 4^\circ\text{F}$) convection oven for 30 minutes. The test panels shall then be removed from the oven and halfway immersed in a 10 percent dilution (by volume) of cleaning compound (Types I and II) or in the undiluted cleaning compound (Types III, IV and V). The panels shall be soaked in this manner for one minute without agitation, then removed and allowed to drain in an upright position for one minute. They shall then be oven-dried as above. The panels shall then be rinsed in a moderate stream of distilled water until the salt on the portion of the panel that has not been submerged in the

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cleaning solution, appears to have been dissolved. The panel shall then be oven dried as above. The presence of a residue shall then be determined by visual comparison of the immersed and nonimmersed halves of the panel.

4.6.10 Effect on acrylic plastics. The effect on acrylic materials shall be determined in accordance with ASTM F 484 using Type A and Type C specimens loaded to 3000 and 4500 psi outer fiber stress, respectively. Cleaning compound concentrations shall be as follows:

Type I	as received 10% dilution in distilled water
Type II	as received 10% dilution in distilled water
Type III	As received
Type IV	As received
Type V	As received

4.6.11 Effect on polyimide wire. Approximately 61 cm (24 in.) of wire conforming to MIL-W-81381/11-20 shall be formed into a coil. Place the coil in a 118 ml (4 ounce) wide mouth jar. Add to the jar sufficient concentrated cleaning compound to cover completely the coil of wire. Cap the jar and store it at room temperature for 14 days. At the end of the storage period, remove the coil and rinse thoroughly with tap water at room temperature. Suspend the coil and allow it to drain until completely dry. The wire shall then be uncoiled and subjected to a double reverse wrap on a 0.3 cm (0.125 in.) mandrel. In case of failure, the test shall be terminated. If the wire is acceptable, it shall be subjected to and withstand a one minute dielectric test of 2,500 volts (rms) and examined for breakdown or leakage.

4.6.12 Abrasiveness (Type III and IV only). A Gardner heavy duty wear tester or equivalent shall be used for this test. A block fitted with a white cotton terry cloth conforming to MIL-C-1164 shall be inserted in the instrument holder. The combined weight of the block, cloth and holder shall be $1,360 \pm 20$ grams. The area of contact with the specimen shall be 7.5 square inches. Type III and IV cleaners shall be tested using panels conforming to designations B and C, respectively. Test panel gloss shall be measured using a 60-degree calibrated glossmeter. The panel shall then be placed on the wear tester. Pour 10 ml of the concentrate onto the test panel and 15 ml onto the terry cloth attached to the cleaning block in the instrument holder. After three minutes, place the terry cloth on the cleaning block in contact with the panel and start the tester. The cleaning block shall travel completely across the panel and return (one cycle) at a speed of 15 to 18 inches per second. After 50 cycles, the test panel shall be removed and rinsed under cold, running tap water and blotted dry with terry cloth. Repeat this procedure four times using the same panel. Each time the procedure is repeated, a new terry cloth and additional cleaning compound shall be used. At the completion of the fifth run, the gloss shall again be measured for conformance to 3.11. When rinsing the test panel, the paint surface shall be observed for the presence of a water break.

4.6.13 Cleaning ability.

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4.6.13.1 Control formulas. Prepare the following cleaner formulas for comparison testing:

4.6.13.1.1 Type I. Blend in the following order:

	<u>Parts by weight</u>
Igepal CO-630 (Note 1)	10.0
Igepal CO-730 (Note 1)	10.0
Monamid 150-CW (Note 2)	5.0
Dipropylene glycol methyl ether	10.0
Hexylene glycol	8.0
Solvent G (Note 3)	10.0
Deionized water	43.5
Benzotriazole	0.5

Blend until homogeneous, then reduce pH to 8.0 with glacial acetic acid. Add the following and blend until homogeneous:

Hostacor 2098 (Note 4)	2.0
Morpholine	<u>1.0</u>
TOTAL	100.0

Final pH of the cleaning compound shall be in the range of 8.5 to 9.5.

Notes: (1) GAF Corporation or equivalent
 (2) Mona Industries, Incorporated or equivalent
 (3) Union Oil Company of California or equivalent
 (4) American Hoechst Corporation or equivalent

4.6.13.1.2 Type II. Blend in the following order:

	<u>Parts by weight</u>
Igepal CO-630 (Note 1)	10.0
Monamid 150-CW (Note 2)	5.0
Dipropylene glycol methyl ether	10.0
Deionized water	71.5
Benzotriazole	0.5

Blend until homogeneous, then reduce pH to 8.0 with glacial acetic acid. Add the following and blend until homogeneous:

Hostacor 2098 (Note 3)	2.0
Morpholine	<u>1.0</u>
TOTAL	100.0

Final pH of the cleaning compound shall be in the range of 8.5 to 9.5.

Notes: (1) GAF Corporation or equivalent
 (2) Mona Industries, Incorporated or equivalent
 (3) American Hoechst Corporation or equivalent

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4.6.13.1.3 Type III. No control formula currently exists for this type of cleaning compound.

4.6.13.1.4 Type IV. Blend in the following order:

	<u>Parts by weight</u>
Monamulse 653-C (Note 1)	7.1
Monamine 1-76 (Note 1)	2.7
Aromatic 150 (Note 2)	7.5
Isopar M (Note 2)	7.5
Diethylene glycol butyl ether	3.55
Decanol	1.55

Blend until homogeneous. In a separate container, blend the following in order:

Trisodium phosphate (dodecahydrate)	2.7
Water	55.0
Pluronic F98 (Note 3)	1.8
Hycar 1422 (Note 4)	<u>10.6</u>

TOTAL 100

Combine the two mixtures, add 0.002g of Pylam LX-6545 (Note 5) and blend thoroughly. After 48 hours, reduce pH with glacial acetic acid to 9.5 and blend thoroughly. Adjust consistency with single drops of decanol or diethylene glycol butyl ether.

Notes: (1) Mona Industries, Incorporated or equivalent
 (2) Exxon Company or equivalent
 (3) BASF Corporation or equivalent
 (4) B.F. Goodrich Company or equivalent
 (5) Pylam Products Company or equivalent

4.6.13.1.5 Type V. Blend in the following order:

	<u>Parts by weight</u>
Monamulse 653-C (Note 1)	8.0
Monamine 1-76 (Note 1)	3.0
Aromatic 150 (Note 2)	8.5
Isopar M (Note 2)	8.5
Diethylene glycol butyl ether	4.0
Decanol	1.30

Blend until homogeneous. In a separate container, blend the following in order:

Trisodium phosphate (dodecahydrate)	3.0
Water	62.2
Pluronic F98 (Note 3)	<u>1.5</u>

TOTAL 100

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Combine the two mixtures, add 0.002g Pylam LX-6545 (Note 4) and blend thoroughly. Reduce pH, if necessary, to between 9.5 and 10.0 using glacial acetic acid and blend thoroughly. Adjust consistency with single drops of decanol or diethylene glycol butyl ether.

- Notes: (1) Mona Industries, Incorporated or equivalent
 (2) Exxon Company or equivalent
 (3) BASF Corporation or equivalent
 (4) Pylam Products Company or equivalent

4.6.13.2 Cleaning ability on Tactical Paint Scheme (TPS) Coating (Types I, II and IV only).

4.6.13.2.1 Panel preparation. Aluminum alloy panels 15.2 by 6.4 by 0.05cm (6 by 2.5 by 0.02 in.) shall be finished in accordance with panel designation C of Table VI. Panels shall then be conditioned for one week at 66°C (150°F). Only those panels having a 60-degree gloss not less than 2.0 and not more than 4.0 shall be used for this test. The lightness value (L-value in a L-a-b color system) shall be measured using a McBeth 1010S Colorimeter (illuminant C) or equivalent prior to soil application (Lv), prior to cleaning (Ls), and following cleaning (Lc).

4.6.13.2.2 Soil preparation. Hydraulic fluid soil shall be prepared by blending 50 grams of carbon black (Columbian Chemicals Company Raven 1040 or equivalent) and 500 grams of MIL-H-83282 fluid with a high speed Cowles type dispersator for 15 minutes. Molybdenum disulfide grease soil shall be prepared by blending 50 grams of carbon black and 500 grams of MIL-G-21164 grease with a mechanical grease worker for 15 minutes. Wire rope lubricant (Sprayon No. 201) is applied from an aerosol spray can as received.

4.6.13.2.3 Application of hydraulic fluid and grease soils. Using a soft bristle brush, gently paint the coated surface of a test panel with the test soil. Remove excess hydraulic fluid soil by covering the test panel with folded absorbent tissue and exerting pressure by rolling over the tissue with a five pound rubber cylinder; Repeat this blotting procedure twice. Remove excess grease soil by stroking the test panel with a piece of MIL-C-83957 cleaning pad five times. Brush each test panel using ten strokes of a hog bristle brush (supplied by Pacific Scientific, Bethesda, MD; catalog no. WG2000B or equivalent). Each freshly soiled panel shall be baked at $105 \pm 1^\circ\text{C}$ ($221 \pm 2^\circ\text{F}$) for 60 minutes then cooled to room temperature and used within four hours.

4.6.13.2.4 Application of wire rope lubricant. Spray wire rope lubricant onto a test panel and immediately wipe back and forth using a piece of MIL-C-83957 cleaning pad (3/8 inch thickness) to achieve a uniform soil in the center of the panel. Color and uniformity of all test panels shall be similar. Bake the soiled test panels at $105 \pm 1^\circ\text{C}$ ($221 \pm 2^\circ\text{F}$) for 60 minutes then cool to room temperature prior to use.

4.6.13.2.5 Cleaning. The test panel shall be cleaned using a Gardner heavy duty wear tester, as shown in figure A-1 or equivalent, fitted with a cellulose sponge (supplied by 3M Company, Minneapolis, MN; Catalog No. 63 or equivalent). The sponge shall be cut such that the dimension parallel to the

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cleaning stroke is 9 cm (3.5 in.) and the width is 7 cm (2.75 in.). The cleaning head with the dry sponge attached shall be weighed to a mass of 1370 to 1380 grams. Type I and II cleaning compounds shall be prepared by diluting 1 part cleaner with 9 parts distilled water. Type IV cleaning compounds shall be tested as received. After placing a soiled test panel in the template at + 45 degrees (see Figure A-2), the cleaning solution shall be applied to the sponge then applied to the soiled test panel so that it is completely covered. After allowing a 30 second dwell time, the test panel shall be cleaned using 5 cycles of the wear tester, then turned 90 degrees and cleaned for an additional 5 cycles. The panel shall then be rinsed under cold running tap water and allowed to dry.

4.6.13.2.6 Evaluation. The colorimeter L values for unsoiled panel (L_v), after soiling (L_s), and after cleaning (L_c) shall be used in determining the percent cleaning efficiency as follows:

$$\text{Cleaning efficiency (\%)} = \left(\frac{L_c - L_s}{L_v - L_s} \right) \times 100$$

4.6.13.3 Cleaning ability on embedded soil (Type III only).

4.6.13.3.1 Panel preparation. Prepare a slurry of carbon black (Columbia Chemicals Company Raven 1040 or equivalent) in methyl ethyl ketone (MEK) by mixing 5g of carbon black with 100g of MEK. Spray the slurry onto a 7.5 by 15 cm (3 by 6 inch) gloss painted test panel, prepared as in Table VI (Panel designation "B"), using the following conditions:

Spray gun: Conventional paint spray gun (siphon feed)
 Air pressure: 50 psi
 Standoff distance: 6 inches (15 cm)
 Spray pattern: Circular - approximately one-inch diameter

Spray for 30 seconds into the center of each test panel. Wipe the loose residue from the surface with terry cloth conforming to MIL-C-1164 and dry the panels at room temperature for 1 hour. Apply undiluted Type IV cleaner to one test panel using terry cloth. Rub the cleaner over the soiled area for 30 seconds using moderate hand pressure and rinse thoroughly with cold tap water. If most of the soil remains, the panels are suitable for cleaning tests as in 4.6.13.3.2. If the soil is easily removed, reapply using 70 psi gun pressure.

4.6.13.3.2 Cleaning. Apply undiluted Type III cleaner to an untested soiled panel using terry cloth. Rub the cleaner over the soiled area for 30 seconds using moderate hand pressure and rinse thoroughly with cold tap water. Examine for soil residue.

4.6.13.4 Cleaning ability on vertical surfaces (Type V only).

4.6.13.4.1 Panel preparation. Spray one of the test soils (MIL-C-81309 soil from spray can or Sprayon No. 201) onto an aluminum test panel which is at least 12 by 40 cm (5 by 16 inches) in size and prepared as in Table VI (Panel designation "B"). When using the wire rope lubricant, immediately wipe back and forth using a piece of MIL-C-83957 cleaning pad (3/8 inch thickness)

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to achieve a uniform soil. When using corrosion preventive compound soil (MIL-C-81309), apply a uniform film thickness, but do not wipe. Bake the test panels at $105 \pm 1^\circ\text{C}$ ($221 \pm 2^\circ\text{F}$) for 1 hour.

4.6.13.4.2 Cleaning. Position the soiled test panel such that the short dimension is vertical and the long dimension horizontal. Apply control formula to half the test panel and the product to be tested to the other half using a pump spray applicator, such as that used in 4.6.22. After 5 minutes, rinse the test panel by spraying with distilled water using the same pump spray device. Repeat this procedure using a 10 minute dwell time. Compare the cleaning ability of the two cleaners.

4.6.14 Stability.

4.6.14.1 Accelerated storage stability.

4.6.14.1.1 Preparation of test sample. A 147.9 ml (5 oz) portion of a well shaken cleaning compound shall be poured into each of two chemically clean 254.9 ml (12 oz) pressure resistant clear glass bottles which shall be approximately 24.1 cm (9.5 in.) in height and 6.4 cm (2.5 in.) 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 15.2 by 1.27 by 0.05 cm (6 by 0.5 by 0.02 in.) conforming to MIL-S-7952 shall be polished with 280-grit silicon carbide paper to remove surface contamination and then cleaned by boiling for one minute in mineral spirits, and one minute in isopropyl alcohol. The steel strip shall be placed in the other test bottle and the bottle shall be capped. The capped bottle containing the steel strip shall be rolled on its side to completely coat the steel strip.

4.6.14.1.2 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. On the sixth day, the bottle shall be removed from the bath, uncapped, examined for separation and the steel strip withdrawn from the bottle. Separation into layers shall be cause for rejection. Examine the steel strip for evidence of corrosion or discoloration. The open bottle shall be capped and the two bottles shall be thoroughly shaken for one minute, then allowed to remain undisturbed for one hour at room temperature and then examined. Any marked change in the color and uniformity of the heated sample shall be considered as showing unsatisfactory stability properties. The aged sample shall then be tested for cleaning efficiency in accordance with 4.6.13.

4.6.14.2 Low temperature stability. Approximately 50 ml of the cleaning compound shall be poured into a test tube of suitable size and cooled to $-18 \pm 5^\circ\text{C}$ ($0 \pm 9^\circ\text{F}$) in a cold box. The sample shall be held at this temperature for one hour. The sample shall then be removed from the cold box and the temperature allowed to rise to room temperature. Invert the test tube five times and examine the content for homogeneity.

4.6.14.3 Hard water stability (Types I and II only).

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4.6.14.3.1 Preparation of stock solution. A 10-grain hard water stock solution shall be prepared by dissolving 0.20 ± 0.005 g of analytical reagent grade calcium acetate monohydrate and 0.14 ± 0.005 g of analytical reagent grade magnesium sulfate heptahydrate in one liter of boiled distilled water.

4.6.14.3.2 Procedure. Five milliliters of cleaning compound shall be added to each of three 50-ml graduated cylinders. Forty five milliliters of the synthetic hard water shall be added to each of the graduated cylinders and the solution mixed well. Allow the solutions to stand undisturbed for 16 hours at a temperature of $25 \pm 5^\circ\text{C}$ ($77 \pm 9^\circ\text{F}$). At the end of the 16 hours, examine the solutions for cloudiness or separation.

4.6.14.4 Storage stability. The one gallon metal pail conforming to PPP-P-704, Type I, Class 1, filled with cleaning compound furnished for storage stability shall be stored for 6 months at $21 \pm 3^\circ\text{C}$ ($70 \pm 5^\circ\text{F}$). In addition, one gallon of the cleaning compound shall be poured into a glass container to which has been added a cleaned and polished, with 280 grit silicon carbide paper, metal strip conforming to MIL-S-7952. The total surface area of the steel strip shall be 38.7 ± 3.2 sq cm (6 ± 0.5 sq in.). The second gallon shall be stored under the same conditions of time and temperature. After the 6 month storage period, both samples shall be tested for cleaning efficiency and examined for evidence of separation, crystallization or deterioration, steel corrosion, container incompatibility, distortion, leakage or container corrosion.

4.6.15 Foaming properties (Types I and II only). One part of the undiluted compound shall be mixed with 9 parts hard water (see 4.6.14.3.1). One hundred milliliters of this mixture shall be placed in a 500 ml capacity blender with a maximum 9.5 cm (3.75 inch) outside diameter (Eberbach Corp. Model 8470 or equivalent). The blender shall be turned on and run for 2 minutes at $8,000 \pm 1,000$ rpm. A stabilized foam is indicated by negligible agitation at the upper surface. The blender shall be turned off after 2 minutes and allowed to stand undisturbed for 6 minutes. After standing for 6 minutes, 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 and the test should be discontinued. If the compound passes this test, it shall be tested by spraying as a foam from a B&B Chemical Portafoamer 20 or equivalent, using tap water. The first application shall be made to an aluminum panel, 61 by 61 cm (24 by 24 inches), from a hose having an inside diameter of 2.5 cm (1 in.) and 15.2 by 22.9 m (50 to 75 ft) long at a dilution ratio set at 1 part compound to 9 parts water. The second application shall be made to a similar panel with a hose having an inside diameter of 1.9 cm (3/4 in.) and 7.6 m (25 ft) in length with dilution set at 1 part compound to 9 parts water. The panels shall be held at an angle of 60 degrees to the horizontal.

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

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4.6.17 Net weight (Type IA). A pressurized can shall be weighed. The cleaning compound shall be sprayed for 3 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.

4.6.18 Performance (Type IA). Panels shall be prepared and cleaned as described in 4.6.13.2. The Type IA sample shall be sprayed on the soiled panel. The Type I control formula diluted to twenty percent by volume shall be poured onto the test panel. The cleaned panels shall then be compared.

4.6.19 Composition (Type IA). A contractor's notarized certificate of compliance signed by a responsible official of the company is acceptable for the composition of Type IA.

4.6.20 Service evaluation. The service evaluation tests, performed by an activity designated by the activity responsible for qualification, shall consist of a field evaluation (actual cleaning of an aircraft) of the sample (see 4.3.2.1) under service conditions, conducted with standard operational procedures on two or more aircraft, selected at random, to determine suitability of cleaning compound for military use. Type I and II cleaners shall be tested using available foam generating equipment.

4.6.21 Consistency (Types IV and V only). A consistometer (Central Scientific Company, Chicago, IL; Catalog No. 24925 or equivalent) shall be used as follows: Shake the container of cleaning compound by hand for 10 seconds. Pour the material into the well of the consistometer completely filling it. Release the gate and determine the extent of flow in 10 seconds.

4.6.22 Sprayability (Type V only). Fill a finger pump spray device (12 ounce Windex bottle or equivalent) with cleaning compound. Spray the material onto a vertical aluminum surface and examine the spray and the cleaning compound as it is deposited onto the vertical surface.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or Commercial, as specified (see 6.2.1).

5.1.1 Level A.

5.1.1.1 Types I, II, IV and V. The cleaning compound shall be furnished in 18.9, 56.8 or 208.2 liter (5, 15 or 55 gallon) containers, as specified (see 6.2.1). Unless otherwise specified in the contract or order, the 18.9 liter (5 gal.), 56.8 liter (15 gal.) and 208.2 liter (55 gal.) containers shall 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 flanges shall have three or more full threads, and the plugs shall have sufficient length of thread that three or more full threads are engaged when the plug is screwed tight with gaskets in place. The threads shall be American Standard modified pipe threads. The 18.9 liter (5 gal.) pail in which the cleaning compound is furnished for uses, other than the foam generator, shall have a flexible spout. The internal surfaces of all containers shall be lined with a material that shall not adversely affect nor be adversely affected by the cleaning compound.

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5.1.1.2 Type IA. Unless otherwise specified in the contract or order, Type IA cleaning compound shall be packaged in 16 ounce 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 or be affected by the cleaning compound. The value 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.

5.1.1.3 Type III. The cleaning compound shall be packaged in 946 ml (1 qt) or 18.9 liter (5 gallon) containers. Unless otherwise specified in the contract or order, the container shall conform to PPP-C-96, Type V, Class A. All internal surfaces of the container shall be lined with a material that shall not adversely affect nor be adversely affected by the cleaning compound.

5.1.2 Commercial. The cleaning compound shall be packaged in specified quantities in a manner that shall afford adequate protection to prevent damage during shipment under environmental conditions utilizing containers required by 40 CFR 100-199.

5.2 Packing. Packing shall be level A, B or Commercial, as specified (see 6.2.1).

5.2.1 Level A. Twenty-four containers, packaged as specified in 5.1.1.2, shall be packed in a fiberboard box conforming to PPP-B-636, class weather resistant. The 24 cans shall be arranged 4 in width and 6 in length. Each unit shall be nested in a snug fitting, full-height, half-slotted style partition. The box shall be lined on all sides and top and bottom. The partition and lining shall conform to type CF, class domestic, style RSC, grade 200 of PPP-B-636. The box shall be closed as specified in the appendix of PPP-B-636. The cleaning compound, when packaged as specified in 5.1.1.1, shall require no overpacking. Standard 4-way entry pallets are required for handling by mechanical equipment.

5.2.2 Level B. Twenty-four containers, packaged as specified in 5.1.1.2, shall be packed in a fiberboard box conforming to PPP-B-636, type CF, class domestic, style RSC, grade 200. The 24 cans, arranged 4 in width and 6 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 shall be lined on all sides and top and bottom. The box, partition and lining shall be made of the same material. The box closure shall be as specified in the appendix of PPP-B-636. The cleaning compound, when packaged as specified in 5.1.1.1, shall require no overpacking. Standard 4-way entry pallets are required for handling by mechanical equipment.

5.2.3 Commercial. The cleaning compound, packaged as specified in 5.1.2, 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 shipping containers shall be in compliance with the requirements of the National Motor Freight Classification and the Uniform Freight Classification rules.

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5.3 Palletization. Unless otherwise specified (see 6.2.1), cleaning compound of one type only, packaged in 18.9, 56.8 or 208.2 liter (5, 15 or 55 gal.) containers as specified in 5.1.1.1, 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 banded with primary, secondary and horizontal straps in accordance with means K, L and E and shall have storage aid 5 applied.

5.4 Marking. All containers of cleaning compound shall be clearly labeled with the manufacturer's name and product designation, date of manufacture, and pH of the cleaning compound. Shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129. In addition, all containers of cleaning compound shall be clearly labeled as follows:

5.4.1 For Type I cleaning compound, container shall be labeled:

EXTERIOR AIRCRAFT CLEANER GENERAL USE (AROMATIC) - MIL-C-85570,
TYPE I USE ONLY WITH ADEQUATE VENTILATION

Directions:

Light soil: Mix 1 part cleaner in 16 parts water
Moderate soil: Mix 1 part cleaner in 9 parts water
Heavy soil: Mix 1 part cleaner in 4 parts water
Apply with foam generator, spray, sponge, brush or cloth
Scrub, then rinse with fresh water.

5.4.2 For Type IA cleaning compound, containers shall be labeled:

EXTERIOR AIRCRAFT CLEANER GENERAL USE AEROSOL (AROMATIC) -
MIL-C-85570, TYPE IA

Directions:

Spray cleaner onto surface to be cleaned.
Allow it to remain on surface up to 3 minutes.
Scrub with a brush or rub with a clean cloth.
Rinse thoroughly with fresh water or wipe dry.

5.4.3 For Type II cleaning compound, containers shall be labeled:

EXTERIOR AIRCRAFT CLEANER
GENERAL USE (NON-AROMATIC) - MIL-C-85570, TYPE II

Directions:

Light soil: Mix 1 part cleaner in 9 parts water
Moderate soil: Mix 1 part cleaner in 4 parts water
Heavy soil: Mix 1 part cleaner in 1 part water
Apply with foam generator, spray, sponge, brush or cloth.
Scrub, then rinse with fresh water.

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- 5.4.4 For Type III cleaning compound, containers shall be labeled:

EXTERIOR AIRCRAFT CLEANER, ABRASIVE SPOT CLEANER (FOR GLOSS PAINT SURFACES ONLY) - MIL-C-85570, TYPE III

Directions:

Apply full strength with a damp cloth.
 Rub with a circular motion.
 Rinse thoroughly, then dry with clean cloth.
 Do not allow cleaner to dry on surfaces.

- 5.4.5 For Type IV cleaning compound, containers shall be labeled:

EXTERIOR AIRCRAFT CLEANER, RUBBERIZED SPOT CLEANER - MIL-C-85570, TYPE IV

Directions:

Apply full strength with a non-abrasive cleaning pad.
 Allow 1 to 3 minutes dwell time.
 Rub with a circular motion.
 Rinse thoroughly, then dry with a clean cloth.
 Do not allow cleaner to dry on surface.

- 5.4.6 For Type V cleaning compound, containers shall be labeled:

EXTERIOR AIRCRAFT CLEANER, GEL TYPE DEGREASER - MIL-C-85570, TYPE V

Directions:

Apply full strength with brush or pump spray.
 Allow 5 to 15 minutes dwell time.
 Brush, if necessary, then spray with fresh water to rinse.
 Brush then rinse again to completely remove cleaner.

6. NOTES

6.1 Intended use. The cleaning compound is intended for use in cleaning painted and unpainted aircraft surfaces. Type I and Type IA should be used for general cleaning outdoors or where sufficient ventilation is available. Type II may be used inside or in areas of limited ventilation. Type I and Type II may be used for general cleaning of both high gloss and camouflage paint systems. Type III is designed for cleaning the exhaust tract and gun blast soil from high gloss paint systems only. Type IV is for use on low gloss tactical paint scheme coatings to clean stubborn areas such as boot marks and smudges as well as gun blast and exhaust track soil. Type V can be used in wheel wells, wing butts and other areas where complete rinsing with water can be tolerated.

- 6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Type of cleaning compound required (see 1.2).

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- c. Quantity of cleaning compound desired.
- d. Type and capacity of containers required (see 5.1.1).
- e. Selection of applicable levels of preservation and 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 (3.785 liters) 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 Qualified Products List (QPL-85570) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Air Systems Command, Department of the Navy, Washington, DC 20361.

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 Material safety data sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent government mailing addresses for submission of data are listed in appendix B of FED-STD-313.

6.6 Subject term (key word) listing.

aerosol
aromatic solvent
cleaning compound
degreaser
qualification

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

Custodians
Navy - AS
Air Force - 68

Preparing activity:
Navy - AS
(Project No. 6850-0788)

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TABLE I. Physical and chemical requirements.

Characteristic	Requirements	
	Min.	Max.
pH value at 25°C	7.0	10.0
Insoluble matter, percent by weight (Types I and II only)	-	0.1
Flash point, °C (ASTM D 56 Types I and II, ASTM D 95 all other Types)	60	-
Biodegradability of surfactant present, percent	90	-
Solvent content, percent by weight Types I, IV and V		
Total	-	32
Aromatic	-	10
Type II		
Total	-	15
Aromatic	Prohibited	

TABLE II. Corrosion limits.

Test panel	Weight change mg/cm ² /24 hours
Aluminum 7075-T6 (QQ-A-250/12)	0.04
Magnesium AZ31B-H24 (AMS 4377); chrome pickled (MIL-M-3171)	0.20
Titanium 6Al4V (MIL-T-9046)	0.04
Steel 1020 (MIL-S-7952)	0.04
Steel (MIL-S-7952); cadmium plated (QQ-P-416)	0.20

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TABLE III. Qualification inspection.

Inspection	Paragraph	
	Requirement	Test method
pH	Table I	4.6.1
Insoluble	Table I	4.6.2
Flash point	Table I	4.6.3
Solvent content	Table I	4.6.4.3 <u>1/</u>
Compositional assurance	3.3.1	4.6.4
Sandwich corrosion	3.4.1	4.6.5.2
Total immersion corrosion	3.4.2	4.6.5.1
Hydrogen embrittlement	3.5	4.6.6
Effect on painted surfaces	3.6	4.6.7
Effect on unpainted surfaces	3.7	4.6.8
Effect on salt-coated surfaces	3.8	4.6.9
Effect on acrylic plastics	3.9	4.6.10
Effect on polyimide wire	3.10	4.6.11
Abrasiveness	3.11	4.6.12
Carbonaceous soil removal	3.12	4.6.13.3
Camouflage paint cleaning	3.12.2	4.6.13.2
Accelerated storage stability	3.13.1	4.6.14.1
Low temperature stability	3.13.2	4.6.14.2
Hard water stability	3.13.3	4.6.14.3
Storage stability	3.13.4	4.6.14.4
Foaming properties	3.14	4.6.15
Service evaluation	3.15	4.6.20
Consistency	3.3.3	4.6.21
Sprayability	3.3.4	4.6.22

1/ The manufacturer shall submit a certificate of compliance for aromatic solvent content.

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TABLE IV. Quality conformance inspection

Inspection	Paragraph	
	Requirement	Test Method
pH	Table I	4.6.1
Insoluble matter	Table I	4.6.2
Flash point	Table I	4.6.3
Compositional assurance	3.3.1	4.6.4
Total immersion corrosion	3.4.2	4.6.5.1
Effect on painted surfaces	3.6	4.6.7
Effect on unpainted surfaces	3.7	4.6.8
Effect on acrylic plastics	3.9	4.6.10
Abrasiveness	3.11	4.6.12
Accelerated storage stability	3.13.1	4.6.14.1
Low temperature stability	3.13.2	4.6.14.2
Hard water stability	3.13.3	4.6.14.3
Foaming properties <u>1/</u>	3.14	4.6.15

1/ Waring blender test only.

TABLE V. 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 VI. Panel preparation.

Panel designation	Processing steps	Material	Number of coats	Thickness per coat mil	Drying time between coats	Drying time after final coat
A	1	Epoxy primer MIL-P-23377	1	0.5 - 1.0	1 hour at room temperature	---
	2	Lacquer, acrylic MIL-L-19537	2	0.7 - 1.0	1 hour at room temperature	72 hours
B	1	Primer, coating epoxy polyamide MIL-P-23377	1	0.6 - 0.9	1 - 2 hours at room temperature	---
	2	Coating urethane, aliphatic isocyanate MIL-C-83286 (Color No. 17875)	mist coat	---	15 minutes at room temperature	---
	3	Coating urethane, aliphatic isocyanate MIL-C-83286 (Color No. 17875)	wet coat	1.5 - 2.5	---	Air dry one week at room temperature
C	1	Primer, Coating Epoxy polyamide MIL-P-23377	1	0.6 - 0.9	1 - 2 hours at room temperature	---
	2	Coating urethane, aliphatic isocyanate MIL-C-83286 (Color No. 36440 or No. 36495)	mist coat	---	15 minutes at room temperature	---
	3	Coating urethane, aliphatic isocyanate MIL-C-83286 (Color No. 36440 or No. 36495)	wet coat	1.5 - 2.5	---	Air dry one week at room temperature

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TABLE VII. Synthetic sea water composition

Constituent	Grade	Grams per liter
Sodium chloride (NaCl)	Technical	50.0
Magnesium chloride (MgCl ₂ · 2H ₂ O)	Technical	22.0
Calcium chloride (CaCl ₂ · 2H ₂ O)	Technical	3.2
Sodium sulfate (Na ₂ SO ₄)	Technical	8.0

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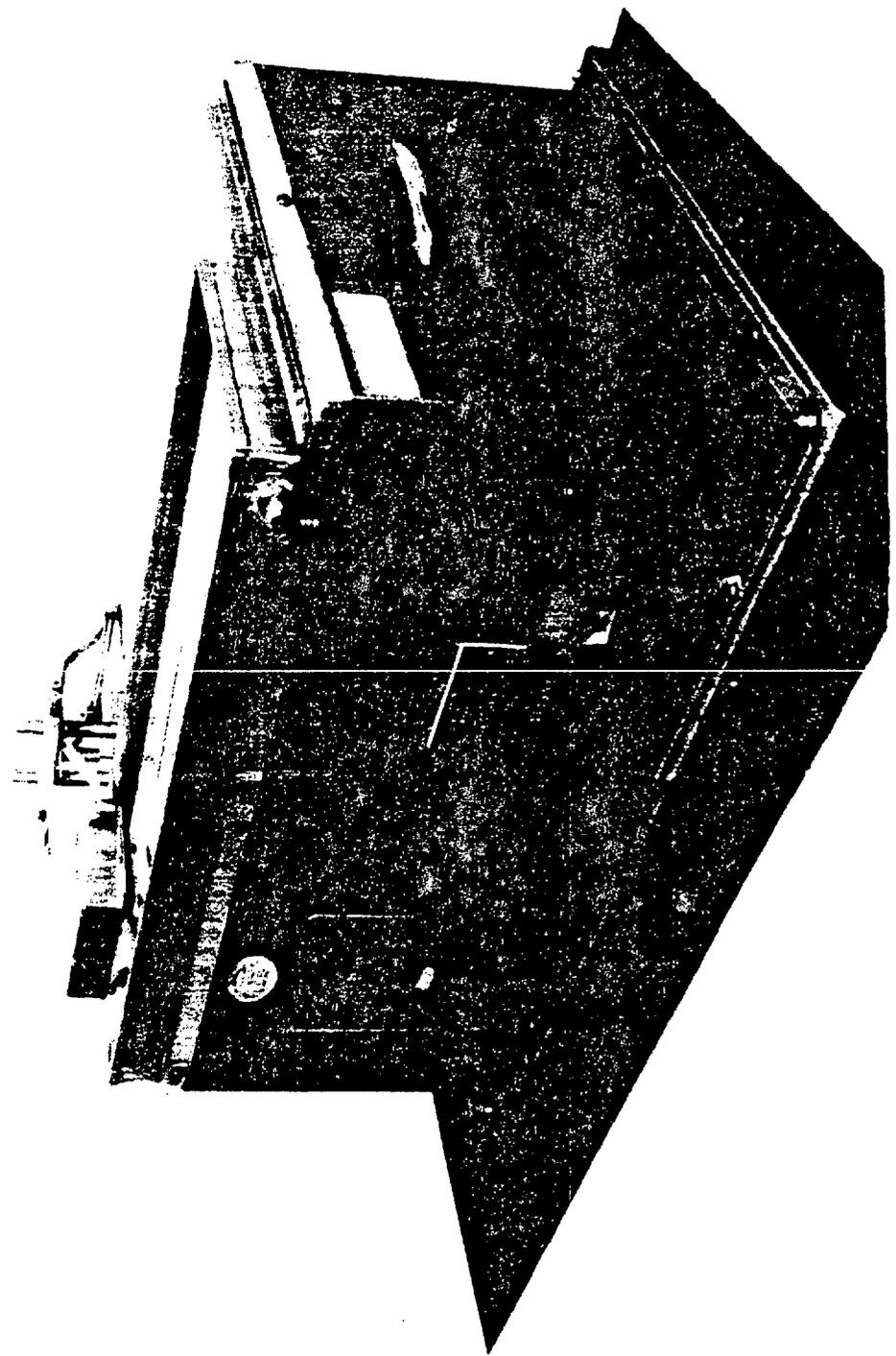
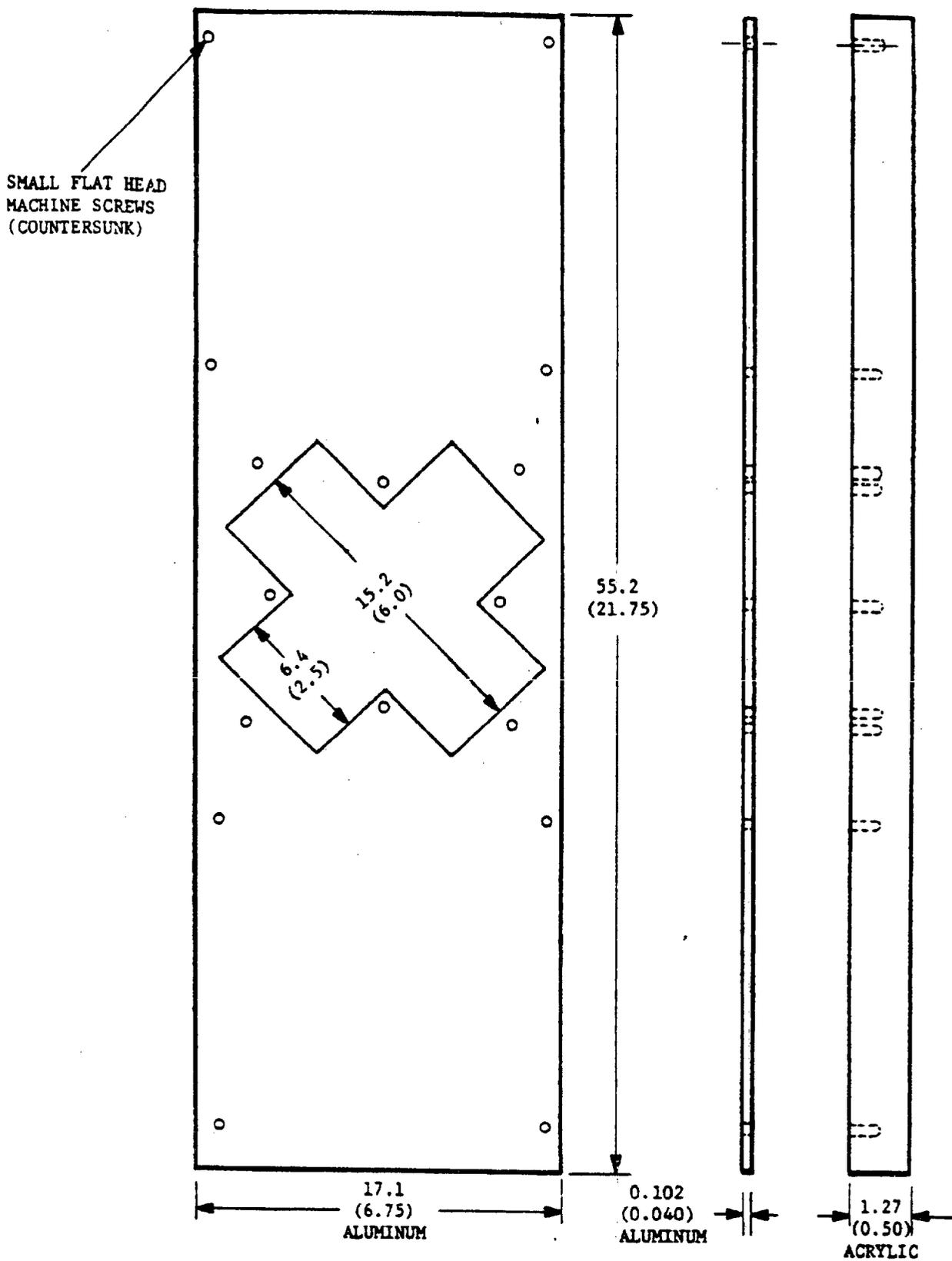


Figure A-1. Gardner heavy duty wear tester.



DIMENSIONS IN CENTIMETERS (INCHES).

Figure A-2. Template.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-C-85570B		2. DOCUMENT TITLE CLEANING COMPOUND, AIRCRAFT, EXTERIOR	
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)	

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