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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 1631A

Issued 1-15-78
Revised 4-1-86

Superseding AMS 1631

CARPET CLEANER
Water Extraction Type

1. SCOPE:

1.1 Form: This specification covers one type of carpet cleaner in the form of a liquid.

1.2 Application: Primarily for use with water extraction machines for in-place cleaning of aircraft carpets.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications and Aerospace Recommended Practices shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2825 - Material Safety Data Sheets
AMS 4037 - Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate)
AMS 4041 - Aluminum Alloy Sheet and Plate, Alclad, 4.4Cu - 1.5Mg - 0.60Mn (Alclad 2024 and 1-1/2% Alclad 2024-T3 Flat Sheet; 1-1/2% Alclad 2024-T351 Plate)
AMS 4045 - Aluminum Alloy Sheet and Plate, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075; -T6 Sheet, -T651 Plate)
AMS 4049 - Aluminum Alloy Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.23CR (Alclad 7075; -T6 Sheet, -T651 Plate)

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Printed in U.S.A.

2.1.2 Aerospace Recommended Practices:

ARP 1512 - Corrosion of Aluminum Alloys by Aircraft Maintenance Chemicals, Sandwich Test

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D56 - Flash Point by Tag Closed Tester
ASTM D1193 - Reagent Water
ASTM D1335 - Tuft Bind of Pile Floor Coverings
ASTM D1568 - Sampling and Chemical Analysis of Alkylbenzene Sulfonates
ASTM F483 - Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
ASTM F484 - Stress Crazing of Acrylic Plastics in Contact with Liquid or Semi-Liquid Compounds
ASTM F502 - Effects of Cleaning and Chemical Maintenance Materials on Painted Aircraft Surfaces
ASTM F503 - Preparing Aircraft Cleaning Compounds, Liquid Type, for Storage Stability Testing

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120 except as specified in 2.3.3.

2.3.1 Military Specifications:

MIL-P-83310 - Plastic Sheet, Polycarbonate, Transparent

2.3.2 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

2.3.3 Federal Aviation Administration Regulations: Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FAR Part 25 - Airworthiness Standards; Transport Category Airplanes

2.4 AATCC Publications: Available from American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.

AATCC Test Method 138 - Washing of Textile Floor Coverings

2.5 CSMA Publications: Available from Chemical Specialties Manufacturing Association, 1001 Connecticut Avenue, Washington, DC 20036.

CSMA Bulletin 308 - Evaluating Resoiling Tendencies of Carpeting

3. TECHNICAL REQUIREMENTS:

3.1 Composition: The composition of the cleaner shall be optional with the manufacturer but shall yield a product conforming to the requirements of 3.2.

3.2 Properties: Cleaner shall conform to the following requirements; tests shall be performed in accordance with specified test methods on the product supplied in concentrated form and, when specified, at use dilution recommended by the manufacturer using ASTM D1193, Type IV, water for dilution. Ø

3.2.1 Solubility: Cleaner shall be soluble in both hard and soft water and shall produce no detectable precipitate, determined in accordance with 3.2.1.1.

3.2.1.1 Prepare a solution of 1 mL of cleaner in 99 mL of ASTM D1193, Type IV, water in a 100 mL glass-stoppered, graduated cylinder. Prepare a second sample of 1 mL of cleaner in 99 mL of synthetic tap water made up as in 3.2.1.1.1. Allow the two samples to stand undisturbed for not less than 1 hr and examine for evidence of scum or sediment. Ø

3.2.1.1.1 Prepare a solution of synthetic tap water using ASTM D1193, Type III, reagent water and analytical reagent-grade chemicals as follows: Ø

AR Calcium Acetate, $Ca(C_2H_3O_2)_2 \cdot 2H_2O$	0.20 g ± 0.005
AR Magnesium Sulfate, $MgSO_4 \cdot 7H_2O$	0.15 g ± 0.005
AR Sodium Chloride, NaCl	0.12 g ± 0.005

3.2.1.1.1.1 Dilute to one litre with ASTM D1193, Type III, water. The pH of the reagent water shall be 6.5 - 7.5. The pH of the synthetic tap water solution shall be approximately 6.8 but within the range 6.5 - 7.5. Ø

3.2.2 Flash Point: Shall be not lower than 60°C (140°F), determined in accordance with ASTM D56.

3.2.3 Corrosion of Metal Surfaces:

3.2.3.1 Sandwich Corrosion: Specimens of AMS 4045 and AMS 4049 aluminum alloy, after test, shall show a rating not worse than 1, determined in accordance with ARP 1512 on cleaner both in the concentrated form and at use dilution. Ø

3.2.3.2 Total Immersion Corrosion: Cleaner, both in the concentrated form and at use dilution, shall neither show evidence of staining, pitting, or discoloration of the panels nor cause a weight change of any panel greater than 0.3 mg/cm^2 per 24 hr, determined in accordance with ASTM F483 on panels of AMS 4037, AMS 4041, AMS 4045, and AMS 4049 aluminum alloys.

3.2.4 Effect on Transparent Plastics: Cleaner, both in the concentrated form and at use dilution, shall not craze, stain, or discolor Type C acrylic plastic, determined in accordance with ASTM F484. The cleaner shall not craze, stain, or discolor MIL-P-83310 polycarbonate plastic or polysulfone plastic, determined in accordance with test procedures specified in ASTM F484 on specimens stressed for 30 min. ± 2 to an outer fiber stress of 3,000 psi (20 MPa). Ø

3.2.5 Effect on Painted Interior Surfaces: Cleaner, at use dilution, shall neither decrease the hardness of the paint film by more than two pencil hardness levels nor shall it produce streaking, discoloration, or other damage to the paint film, determined in accordance with ASTM F502.

3.2.6 Effect on Carpeting:

3.2.6.1 Discoloration: Cleaner, at use dilution, shall neither cause discoloration or other adverse effects on carpeting nor shall it show a force loss of more than 1 lb (4.5 N), determined in accordance with 3.2.6.1.1.

3.2.6.1.1 Cut two adjacent pieces, approximately 6 x 12 in. (150 x 300 mm), from a section of test carpeting. One piece shall be used as a control sample; the other piece shall be sprayed uniformly with 25 - 50 mL of the cleaner at use dilution, allowed to dry for 24 hr + 1, and examined for discoloration, swelling of the latex backing, and other deleterious effects by comparing it with the control sample. Using a 50 lb (225 N) Dial Push-Pull Gauge (Chatillon Model DPP-50 or equivalent) and procedures in accordance with ASTM D1335, pull an individual loop of pile through the top of the carpeting and record the force required. Take four readings on the test sample and four on the control sample and average each set of readings. The difference in the average readings shall be less than 1 lb (4.5 N).

3.2.6.2 Washability and Color Fastness: Standards for acceptance shall be as agreed upon by purchaser and vendor, determined in accordance with AATCC Test Method 138.

3.2.6.3 Flame Retardancy: Ten washings of the carpet with the cleaner at use dilution shall not alter the burn rate characteristics of carpeting, determined in accordance with FAR 25.853.

3.2.6.4 Resoiling Resistance: Shall be equal to or better than standards for acceptance agreed upon by purchaser and vendor, determined in accordance with CSMA Bulletin 308 on carpeting cleaned with the product at use dilution.

3.2.7 Foam Height: Place 100 mL of a 2% solution of the cleaner in ASTM D1193, Ø Type IV, water at 38°C + 1 (100°F + 2) in a glass-stoppered 500 mL cylinder. Shake vigorously for 10 sec + 1. The foam height shall not extend beyond the 250 mL mark immediately upon placing the cylinder to rest nor shall it extend beyond the 150 mL mark one minute thereafter.

3.2.8 Storage Stability: Cleaner, exposed to heat and cold in accordance with ASTM F503, shall show no precipitation, stratification, layering, or separation.

3.3 Quality: The cleaner, as received by purchaser, shall be homogeneous, uniform in color, and free from skins and lumps and from foreign materials detrimental to usage of the cleaner.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of cleaner shall supply all Ø samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the cleaner conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for Ø total immersion corrosion (3.2.3.2), effect on plastics (3.2.4), effect on carpeting (3.2.6), and foam height (3.2.7) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical Ø requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of cleaner to a purchaser, when a change in material, processing, or both requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be in accordance with all applicable requirements of Ø ASTM D1568; a lot shall be all cleaner produced in a single production run from the same batches of raw materials under the same fixed conditions and presented for vendor's inspection at one time.

4.3.1 When a statistical sampling plan and acceptance quality level (AQL) have Ø been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3 and the report of 4.5 shall state that such plan was used.

4.4 Approval:

4.4.1 Sample cleaner shall be approved by purchaser before cleaner for production use is supplied, unless such approval be waived by purchaser. Results of tests on production cleaner shall be essentially equivalent to those on the approved sample.

4.4.2 Vendor shall use ingredients, manufacturing procedures, and methods of inspection on production cleaner which are essentially the same as those used on the approved sample cleaner. If necessary to make any change in ingredients or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material, processing, or both and, when requested, sample cleaner. Production cleaner made by the revised procedure shall not be shipped prior to receipt of reapproval.