Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 1631

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Revised

CARPET CLEANER
Water Extraction Type

1. SCOPE:

1.1 Form: This specification covers one type of carpet cleaner in the form of a liquid for use with water extraction machines.

1.2 Application: Primarily 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 (AMS) and Aerospace Recommended Practices (ARP) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
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 - 0.26Cr (7075; -T6 Sheet, -T651 Plate)
AMS 4049 - Aluminum Alloy Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.26Cr (Alclad 7075; -T6 Sheet, -T651 Plate)

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 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 Craze Test of Acrylic Plastics in Contact with Liquid and 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

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2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120 except as specified in 2.3.3 and 2.3.4.

2.3.1 Military Specifications:

MIL-P-25690 - Plastic, Sheets and Parts, Modified Acrylic Base, Monolithic, Crack Propagation Resistant

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

2.3.4 U. S. Department of Labor, Occupational Safety and Health Administration Forms: Available from regional offices of U. S. Department of Labor, Bureau of Labor Standards.

OSHA Form 20 - Material Safety Data Sheet

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. The cleaner shall not contain ingredients deleterious to interior surfaces of aircraft.

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:

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 distilled or deionized water in a 100 mL glass-stoppered, graduated cylinder. Prepare a second sample using water containing hardness equivalent to 200 ppm $CaCO_3$. Allow the two samples to stand undisturbed for not less than 1 hr and examine for evidence of scum or sediment.

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, 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.

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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 single panel greater than 0.3 mg/cm^2/24 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 Plastics: Cleaner, both in the concentrated form and at use dilution, shall not craze, stain, or discolor MIL-P-25690 stretched acrylic plastic, determined in accordance with ASTM F484. The cleaner, likesise, shall not craze, stain, or discolor polysulfone or polycarbonate plastics, determined in accordance with test procedures specified in ASTM F484 on specimens stressed for 72 hr ± 1 to an outer fiber stress of 3,000 psi (21 MPa).

3.2.5 Effect on Interior Painted 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 (4.45 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 (4.45 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 distilled or deionized 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.

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4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of cleaner shall supply all samples 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 perform such confirmatory testing as he deems 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 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.

4.2.2 Periodic Tests and Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as periodic tests and as preproduction tests.

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 ASTM D1568, unless otherwise specified.

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. 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 any change is necessary in ingredients or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material and procedures and, when requested, sample cleaner. Production cleaner made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports: Unless waived by purchaser, the vendor of cleaner shall furnish with each shipment three copies of a report showing the results of tests on each lot to determine conformance to the acceptance test requirements and stating that the cleaner conforms to the other technical requirements of this specification. This report shall include the purchase order number, material specification number, manufacturer's identification, lot or batch number, and quantity.

4.5.1 Reports of preproduction test results shall include a completed copy of OSHA Form 20 Material Safety Data Sheet, or equivalent, covering cleaner formulation. All requests for modification of formulation shall be accompanied by a similar form for the proposed formulation.

4.6 Resampling and Retesting: If any sample used in the above tests fails to meet the specified requirements, disposition of the cleaner may be based on the results of testing three additional samples for each original nonconforming sample. Failure of any retest sample to meet the specified requirements shall be cause for rejection of the cleaner represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Cleaner shall be packaged in suitable containers of a size agreed upon by purchaser and vendor.

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