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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 1528C

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Superseding AMS 1528B

Cleaner for Aircraft Exterior Surfaces Emulsion, Pressure-Spray Type

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1. SCOPE:

1.1 Form:

This specification covers an emulsion-type, low-foaming cleaner in the form of a liquid.

1.2 Application:

This cleaner has been used typically for removing soils from painted and unpainted exterior surfaces of aircraft by pressure spray or manual application, but usage is not limited to such applications.

1.3 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

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2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2470	Anodic Treatment of Aluminum Alloys, Chromic Acid Process
AMS 2475	Protective Treatments, Magnesium Alloys
AMS 4037	Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate), Solution Heat Treated
AMS 4041	Aluminum Alloy, Alclad, Sheet and Plate, 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 4049	Aluminum Alloy Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075; -T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated
AMS 4376	Plate, Magnesium Alloy, 3.0Al - 1.0Zn (AZ31B-H26), Cold Rolled and Partially Annealed
AMS 4911	Titanium Alloy Sheet, Strip, and Plate, 6Al - 4V, Annealed
AMS 5045	Steel Sheet and Strip, 0.25 max Carbon, Maximum Hard Temper

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 56	Flash Point by Tag Closed Tester
ASTM D 1193	Reagent Water
ASTM D 1568	Sampling and Chemical Analysis of Alkylbenzene Sulfonates
ASTM F 483	Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
ASTM F 484	Stress Crazing 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
ASTM F 1104	Preparing Aircraft Cleaning Compounds, Liquid Type, Water Base, for Storage Stability Testing
ASTM F 1110	Sandwich Corrosion Test
ASTM F 1111	Corrosion of Low Embrittling Cadmium Plate by Aircraft Maintenance Chemicals

2.3 U. S. Government Publications:

Available from DODSSP Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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

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3. TECHNICAL REQUIREMENTS:

3.1 Material:

The composition of the cleaner shall be optional with the manufacturer but should contain water, biodegradable surfactants, emulsifiers, and solvents to produce a low-foaming product completely soluble in water and meeting the requirements of 3.2.

3.2 Properties:

The 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 at use dilution recommended by the manufacturer; diluent shall be ASTM D 1193, Type IV, water.

3.2.1 Corrosion of Metal Surfaces:

3.2.1.1 Sandwich Corrosion: Cleaner shall produce a rating not worse than 1, determined in accordance with ASTM F 1110.

3.2.1.2 Total Immersion Corrosion: The product shall neither cause evidence of corrosion of the panels nor a weight change of any test panel greater than that shown in Table 1, determined in accordance with ASTM F 483:

TABLE 1 - Maximum Immersion Weight Change

Test Panel Material	Weight Change mg/cm^2 per 24 hours
AMS 4037 Aluminum Alloy, anodized as in AMS 2470	0.3
AMS 4041 Aluminum Alloy (optional)	0.3
AMS 4049 Aluminum Alloy	0.3
AMS 4376 Magnesium Alloy, dichromate treated as in AMS 2475	0.2
AMS 4911 Titanium Alloy	0.1
AMS 5045 Carbon Steel	0.8

3.2.1.3 Low-Embrittling Cadmium Plate: Panels coated with low-embrittling cadmium plate shall show a weight change not greater than 0.3 mg/cm^2 per 24 hours, determined in accordance with ASTM F 1111.

3.2.2 Hydrogen Embrittlement: The product shall be non-embrittling, determined in accordance with ASTM F 519, Type 1a, 1c, or 2a.

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3.2.3 Flash Point: Shall be not lower than 60 °C (140 °F), determined in accordance with ASTM D 56.

3.2.4 Effect on Plastics: There shall be no crazing or staining of stretched MIL-P-25690 plastic, determined in accordance with ASTM F 484.

3.2.5 Effect on Painted Surfaces: The product shall neither decrease the hardness of the paint film by more than two pencil hardness levels nor shall it produce any streaking, discoloration, or blistering of the paint film, determined in accordance with ASTM F 502.

3.2.6 Effect on Unpainted Surfaces: The product, tested in accordance with ASTM F 485, shall neither produce streaking nor leave any stains requiring polishing to remove.

3.2.7 Storage Stability: The product shall neither show separation from exposure to heat or cold nor show an increase in turbidity greater than a control sample equally diluted to use concentrationn with ASTM D 1193, Type IV, water, determined in accordance with ASTM F 1104.

3.2.8 Emulsion Stability: Place 20 mL of undiluted cleaning compound into a 100 mL glass-stoppered graduated cylinder and slowly add 80 mL of ASTM D 1193, Type IV, water. Allow to stand for one minute. Insert stopper, invert the cylinder twice, and place on a level surface; a homogeneous emulsion should be formed. If not, the product is not acceptable. If the water/product emulsion is satisfactory, allow to stand undisturbed for one hour and inspect for separation layer between water phase and solvent phase. If any phase is evident, report this in milliliters. Shake the sample by inverting the cylinder through 20 inversions in less than ten seconds. Allow to remain undisturbed for 48 hours and reinspect for phase separation. Report phase separation in milliliters. Any separation beyond 5 mL is not acceptable.

3.2.9 Performance: The product, used in accordance with manufacturer's recommendations, shall remove normally accumulated soils from exterior surfaces of aircraft. No visible residue shall remain on any surface tested. Standards for acceptance shall be as agreed upon by purchaser and vendor.

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 the cleaner shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. 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.

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4.2 Classification of Tests:

4.2.1 Acceptance Tests: Effect on plastics (3.2.4), effect on unpainted surfaces (3.2.6), and quality (3.3) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Corrosion of metal surfaces (3.2.1), hydrogen embrittlement (3.2.2), flash point (3.2.3), effect on painted surfaces (3.2.5), storage stability (3.2.7), emulsion stability (3.2.8), and performance (3.2.9) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.2.3 Preproduction Tests: All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of cleaner to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing:

Shall be in accordance with ASTM D 1568; 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.

4.4 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 ingredients and/or processing and, when requested, sample cleaner. Production cleaner made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

The vendor of cleaner shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and, when performed, to the periodic test requirements and stating that the cleaner conforms to the other technical requirements. This report shall include the purchase order number, AMS 1528C, manufacturer's identification, lot number, and quantity.

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