SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 1541C

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Noncurrent	JUL 2005

Superseding AMS 1541B

Cleaner, Fuel Drop Tank Water-Soluble

NONCURRENT NOTICE

This specification has been declared “NONCURRENT” by the Aerospace Materials Division, SAE, as of July 2005. It is recommended, therefore, that this specification not be specified for new designs.

“NONCURRENT” refers to those specifications which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these specifications for future use in new designs. “NONCURRENT” specifications are available from SAE upon request.

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1. SCOPE:

1.1 Form:

This specification covers a water-soluble, oil-dispersing cleaner in the form of a liquid.

1.2 Application:

Primarily for cleaning and purging external, removable fuel tanks.

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 following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

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

2.1.1 Aerospace Material Specifications:

AMS 2825	Material Safety Data Sheets
AMS 4025	Aluminum Alloy Sheet and Plate, 1.0Mg - 0.60Si - 0.28Cu - 0.20Cr (6061; -T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

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 E 70	pH of Aqueous Solutions With the Glass Electrode
ASTM F 483	Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
ASTM F 485	Effects of Cleaners on Unpainted Aircraft Surfaces
ASTM F 1104	Preparing Aircraft Cleaning Compound, Liquid Type, Water Base, for Storage Stability Testing

2.2 (Continued):

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 Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.3.1 Federal Specifications:

PPP-P-704	Pails, Metal (Shipping, Steel, 1 Through 12 Gallons)

2.3.2 Federal Standards:

FED-STD-791	Lubricant, Liquid Fuel and Related Products, Methods of Testing

2.3.3 Military Specifications:

MIL-T-5624	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-D-16791	Detergent, General Purpose, (Liquid, Nonionic)

2.3.4 Military Standards:

MIL-STD-2073-1	DOD Materiel, Procedure for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Material:

The composition of the cleaner shall be optional with the manufacturer but should contain water, biodegradable surfactants, and other additives as required to produce a product 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 diluted with ASTM D 1193, Type IV, water to use concentration recommended by the manufacturer, except as otherwise specified in 3.2.9.1:

3.2.1 Corrosion of Metal Surfaces:

3.2.1.1 Sandwich Corrosion: Specimens, after test, shall show a rating not worse than 1, determined in accordance with ASTM F 1110.

3.2.1.2 Total Immersion Corrosion: The cleaner shall neither show evidence of corrosion nor cause a weight change of any panel of AMS 4027 aluminum alloy greater than 0.3 mg/cm2 per 24 hours, determined in accordance with ASTM F 483.

3.2.1.3 Low-Embrittling Cadmium Plate: Panels, coated with low-embrittling cadmium plate, shall not show a weight change greater than 0.3 mg/cm2 per 24 hours, determined in accordance with ASTM F 1111.

3.2.2 Effect on Seal and Gasket Material: The cleaner shall not produce a change in volume of Standard "L"- type rubber greater than ±5%, determined in accordance with FED-STD-791, Method 3603.4, except that immersion shall be for 4 hours ± 0.25 at 25°C ± 3 (77°F ± 5).

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

3.2.5 pH: Shall be 7.0 ± 0.5, determined in accordance with ASTM E 70 on the concentrated cleaner.

3.2.6 Temperature Stability: The cleaner shall not show chemical or physical deterioration, including evidence of discoloration, layering, or other change denoting loss of stability, after exposure to 60°C ± 5 (140°F ± 9) for 4 hours ± 0.5.

3.2.7 Miscibility with Jet Fuel: The cleaner shall be completely miscibile with MIL-T-5624, Grades JP4 and JP5, jet fuel to make a uniform solution free of lumps, layering of ingredients, or sediment.

3.2.8 Storage Stability: The cleaner 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 concentration with ASTM D 1193, Type IV, water, determined in accordance with ASTM F 1104.

3.2.9 Performance: The cleaner shall remove all traces of MIL-T-5624, Grades JP4 and JP5, jet fuel, determined in accordance with 3.2.9.1 at 10°C (50°F) or higher.

3.2.9.1 A 5-gallon (18.9 L) storage drum conforming to PPP-P-704 shall be used to simulate a fuel tank. A 1.5 - 2 inch (38 - 51 mm) diameter drain hole shall be placed in the bottom of the tank and a rubber stopper shall be fitted in the opening. The drum shall be washed with a 1% solution of detergent conforming to MIL-D-16791, Type I, detergent, rinsed with water, and dried with oil-free air until the reading for combustible vapors of the container is zero when tested with a combustible gas detector. One pint of MIL-T-5624, Grade JP-5, fuel shall be placed in the container. The container shall be closed and rotated to allow the fuel to contact all the inside surfaces. The cap shall be opened and the drain plug removed. All liquid fuel shall be drained from the drum. The interior of the drum shall give a positive indication of combustible vapors; if it does not, repeat the addition of fuel, drum rotation, and draining. The drain plug shall be inserted. Cleaning solution (25 mL of the cleaner diluted with 500 mL of ATSM D 1193, Type IV, water) shall be poured into the drum and the cap shall be closed. The container shall be shaken and rotated for not less than 2 minutes so that all surfaces are coated with the cleaning solution. The drain plug shall be removed and the cleaning solution allowed to drain. The interior of the drum shall be rinsed with clear, warm water and allowed to drain. The interior of the drum shall be checked for the presence of combustible vapors. A meter reading above zero indicates failure.

3.3 Quality:

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 samples for vendor's tests and shall be responsible for performing 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.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for effect on unpainted surfaces (3.2.4), pH (3.2.5), and miscibility with jet fuel (3.2.7) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests for corrosion of metal surfaces (3.2.1), effect on seal and gasket material (3.2.2), flash point (3.2.3), temperature stability (3.2.6), 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: Tests for 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.