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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 1426C

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Superseding AMS 1426B

Submitted for recognition as an American National Standard

FLUID, DEICING/ANTI-ICING, RUNWAYS AND TAXIWAYS
Glycol Base

1. SCOPE:

1.1 Form:

This specification covers a glycol-base deicing/anti-icing material in the form of a liquid.

1.2 Application:

This fluid has been used typically on airport runways and taxiways for the prevention and removal of frozen deposits of frost and ice, but usage is not limited to such applications.

1.3 Precautions:

1.3.1 Deicing/anti-icing formulations may be mildly toxic and contact with human skin and eyes should be avoided. Prolonged exposure to concentrations exceeding the established threshold limit values (TLV) for the product or its major components should also be avoided.

1.3.2 Caution should be exercised in the use of aqueous glycol deicing/anti-icing solutions in and around aircraft having silver or silver-coated electrical/electronic circuitry. Dehydrolysis reactions which result in fire may occur when such aqueous glycol solutions contact silver or silver-coated circuits, such as defectively insulated wires, switches, or circuit breakers, which are carrying direct current.

1.3.3 Airport authorities should ascertain the friction coefficient of the runway after application of the deicing/anti-icing fluid.

1.4 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 processes 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 2470 Anodic Treatment of Aluminum Alloys, Chromic Acid Process
AMS 2475 Protective Treatments, Magnesium Alloys
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), Solution Heat Treated
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 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 Magnesium Alloy Plate, 3.0Al - 1.0Zn (AZ31B-H26), Cold Rolled and Partially Annealed
AMS 4911 Titanium Alloy Sheet, Strip, and Plate, 6Al - 4V, Annealed
MAM 4911 Titanium Alloy Sheet, Strip, and Plate, 6Al - 4V, Annealed (Metric)
AMS 5045 Steel Sheet and Strip, 0.25 Carbon maximum, Hard Temper

2.2 ASTM Publications:

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

ASTM C 672 Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals
ASTM D 93 Flash Point by Pensky-Martens Closed Tester
ASTM D 891 Specific Gravity of Liquid Industrial Chemicals
ASTM D 1177 Freezing Point of Aqueous Engine Coolants
ASTM D 1193 Reagent Water
ASTM D 1568 Sampling and Chemical Analysis of Alkylbenzene Sulfonates
ASTM D 4057 Manual Sampling of Petroleum and Petroleum Products
ASTM D 4177 Automatic Sampling of Petroleum and Petroleum Products

2.2 (Continued)

ASTM E 70 pH of Aqueous Solutions with the Glass Electrode
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 945 Stress-Corrosion of Titanium Alloys by Aircraft Engine Cleaning Materials
ASTM F 1105 Preparing Aircraft Cleaning Compounds, Liquid Type, Solvent-Based 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
MIL-P-83310 Plastic Sheet, Polycarbonate, Transparent
MIL-STD-290 Packaging of Petroleum and Related Products

2.4 APHA Publications:

Available from American Public Health Association, 1015 Eighteenth Street, NW, Washington, DC 20036.

Standard Methods for the Examination of Water and Waste Water

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Composition of the fluid shall be a glycol-base and shall otherwise be optional with the manufacturer. The fluid may contain urea, formamide, and corrosion inhibitors, etc as required to produce a product meeting the requirements of 3.2.

3.1.1 (R) Biodegradability: Fluid shall be tested in accordance with APHA Standard Methods for Examination of Water and Waste Water. The manufacturer shall provide results of bioassays which shall contain not less than the following information:

3.1.1.1 A statement of ecological behavior of the fluid.

3.1.1.2 The total oxygen demand (TOD) of the fluid, expressed in pounds of oxygen per pound of fluid.

3.1.1.3 Percent of the fluid biodegraded in five days at 20 °C (68 °F).
(R)

3.1.2 Trace Contaminants: Report the presence, in percentage by weight, of
(R) sulfur, halogens, phosphate, nitrate, and heavy metals (lead, chromium, cadmium, and mercury).

3.2 Properties:

The fluid, as supplied by vendor, shall conform to the following requirements.

3.2.1 Flash Point: Shall be not lower than 100 °C (212 °F), determined in
(R) accordance with ASTM D 93.

3.2.2 Specific Gravity: Shall be within ±0.015 of the preproduction value
(R) established in 4.2.3, determined in accordance with ASTM D 891.

3.2.3 pH: Shall be within ±0.5 units of the preproduction value established in
(R) 4.2.3, determined in accordance with ASTM E 70.

3.2.4 Freezing Point:

3.2.4.1 Shall not exceed -23 °C (-10 °F), determined in accordance with
(R) ASTM D 1177.

3.2.4.2 Shall be within ±4 °C (+7 °F) of the preproduction value
(R) established in 4.2.3, determined in accordance with ASTM D 1177.

3.2.5 Corrosion of Metal Surfaces:

3.2.5.1 Sandwich Corrosion: Specimens, after testing in accordance with
(R) ASTM F 1110, shall not show corrosion worse than control panels run using ASTM D 1193, Type IV, water.

3.2.5.2 Total Immersion Corrosion: The fluid, tested in accordance with
(R) ASTM F 483, shall neither show evidence of corrosion of panels nor cause a weight change of any test panel greater than shown in Table 1.

TABLE 1 - Maximum Immersion Corrosion Weight Change

Test Panel	Weight Change mg/cm^2 per 24 Hours
AMS 4037 Aluminum Alloy, Anodized as in AMS 2470	0.3
AMS 4041 Aluminum Alloy	0.3
AMS 4049 Aluminum Alloy	0.3
AMS 4376 Magnesium Alloy, dichromate treated as in AMS 2475	0.2
AMS 4911 or MAM 4911 Titanium Alloy	0.1
AMS 5045 Carbon Steel	0.8

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

3.2.5.4 Stress-Corrosion Resistance: The fluid shall not cause cracks in
(R) AMS 4911 or MAM 4911 titanium alloy specimens, determined in accordance with ASTM F 945, Method A.

3.2.6 Hydrogen Embrittlement: The fluid shall be nonembrittling, determined in accordance with ASTM F 519, Type 1a, 1c, or 2a.

3.2.7 Effect on Transparent Plastic:

3.2.7.1 The fluid, at 25 °C ± 2 (77 °F ± 4), shall not craze, stain, or discolor
(R) MIL-P-25690 stretched acrylic plastic, determined in accordance with ASTM F 484.

3.2.7.2 The fluid, at 25 °C ± 2 (77 °F ± 4), shall not craze, stain, or discolor
(R) MIL-P-83310 polycarbonate plastic, determined in accordance with ASTM F 484, except that the specimens shall be stressed for 30 minutes ± 2 to an outer fiber stress level of 13.8 MPa (2000 psi).

3.2.8 Effect on Painted Surfaces: The fluid, at 25 °C ± 2 (77 °F ± 4), shall
(R) neither decrease the paint film hardness 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.

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

3.2.10 Rinsibility: The fluid shall be completely rinsible in tap water, determined in accordance with 3.2.10.1

3.2.10.1 A 75 x 200 mm (3 x 8 inch) panel of clear glass shall be cleaned to provide a surface free of waterbreak, dried, and coated with the deicing/anti-icing fluid by pouring the fluid over the panel while it is held in a horizontal position. The coated panel shall be inclined at an angle of approximately 45 degrees for 10 minutes ± 0.5, then placed in a horizontal position for 24 hours ± 0.25 at room temperature. After the 24 hour exposure, the panel shall be rinsed in tap water for 5 to 6 minutes, followed by a rinse with ASTM D 1193, Type IV, water, allowed to air dry at ambient temperature, and examined for visible traces of the deicing/anti-icing fluid.

3.2.11 Pavement Scaling Resistance: The condition of the surface shall have a rating not greater than 2, determined in accordance with ASTM C 672, except that a 25% by volume solution of the deicing/anti-icing fluid in tap water shall be substituted for calcium chloride,

3.2.12 Storage Stability: The fluid, after storage in accordance with
(R) ASTM F 1105, shall not exhibit separation or an increase in turbidity compared to unaged fluid. Any increase in turbidity shall be reported, but shall be acceptable if removed by mild agitation.

3.2.13 Performance: The fluid, used in accordance with manufacturer's recommendations, shall remove accumulated frozen deposits of frost and ice from airport taxiways and runways. Acceptance criteria and method of test shall be as agreed upon by purchaser and vendor.

3.3 Quality:

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

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of the fluid 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 fluid conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for flash point (3.2.1), specific gravity (3.2.2), and pH (3.2.3) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests for freezing point (3.2.4), corrosion of metal (R) surfaces (3.2.5), hydrogen embrittlement (3.2.6), effect on transparent plastic (3.2.7), effect on painted surfaces (3.2.8), effect on unpainted surfaces (3.2.9), rinsibility (3.2.10), pavement scaling resistance (3.2.11), and storage stability (3.2.12) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser, but in no case less frequently than once every two years.

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 the fluid 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.

4.2.3.1 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, contracting officer, or request for procurement.

4.3 Sampling and Testing:

Shall be in accordance with all applicable requirements of 4.3.1 or 4.3.2; a lot shall be all fluid produced in one continuous manufacturing operation from the same batches of raw materials and presented for vendor's inspection at one time:

4.3.1 Drum Shipments: ASTM D 1568

4.3.2 Bulk Shipments: ASTM D 4057 or ASTM D 4177