AEROSPACE MATERIAL SPECIFICATION

AMS2629	REV. D

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Superseding AMS2629C

Fluid, Jet Reference

RATIONALE

Modify aromatic fluid volume percents to match actual fluid composition used for all testing to validate material compatibility. This is limited scope ballot for this change only.

1. SCOPE

1.1 Form

This specification covers a mixture of liquid hydrocarbons and soluble additives.

1.2 Application

To provide a standard composition, simulating aviation jet engine fuel. This fluid has been used typically in laboratory tests involving compatibility and interaction with aircraft materials, but usage is not limited to such applications.

1.3 Classification

Jet reference fluid shall be classified as follows:

Type 1 Liquid hydrocarbons without the addition of metal ions. Type 1 fluid is intended for all material compatibility tests except chalking evaluations.

Type 2 Liquid hydrocarbons with a controlled concentration of metal ions. Type 2 fluid is intended for chalking evaluations.

1.3.1 Type 1 shall be supplied unless Type 2 is ordered.

1.4 Safety - Hazardous Materials

Shall be in accordance with AS5502 (1.1).

2. APPLICABLE DOCUMENTS

Shall be in accordance with AS5502 (2.).

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS2629D

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AS5502 Standard Requirements for Aerospace Sealants and Adhesion Promoters

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 130 Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

ASTM D 156 Standard Test Method for Saybolt Color Of Petroleum Products (Saybolt Chromometer Method)

ASTM D 664 Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration

ASTM D 1094 Standard Test Method for Water Reaction of Aviation Fuels

ASTM D 1266 Standard Test Method for Sulfur in Petroleum Products (Lamp Method)

ASTM D 1319 Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption

ASTM D 2622 Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry

ASTM D 3227 Standard Test Method for (Thiol Mercaptan) Sulfur in Gasoline, Kerosine, Aviation Turbine, and Distillate Fuels (Potentiometric Method)

ASTM D 3242 Standard Test Method for Acidity in Aviation Turbine Fuel

ASTM D 4294 Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry

ASTM D 5006 Standard Test Method for Measurement of Fuel System Icing Inhibitors (Ether Type) in Aviation Fuels

ASTM D 6379 Standard Test Method for Determination of Aromatic Hydrocarbon Types in Aviation Fuels and Petroleum Distillates - High Performance Liquid Chromatography Method with Refractive Index Detection

2.3 U.S. Government Publications

Available from DLA Document Services, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: (215) 697-6396, http://quicksearch.dla.mil/.

MIL-PRF-25017 Lubricity Improver, Fuel Soluble

MIL-DTL-85470 Inhibitor, Icing, Fuel System, High Flash Nato Cold Number S-1745

3. TECHNICAL REQUIREMENTS

3.1 Standard Tolerances

Unless otherwise specified, standard tolerances shown in Table 1 shall apply:

TABLE 1 – STANDARD TOLERANCES

Measurement Units	Tolerance
Temperature	±2 °F (±1 °C)
Day	±2 hours
Hour	±5 minutes
Minute	±10 seconds
Inches (mm)	±0.010 inch (±0.25 mm)

3.2 Material

3.2.1 Type 1 Fluid

The individual hydrocarbon and aromatic constituents of Type 1 fluid shall conform to the percentages by volume shown in Table 2 determined by wet chemical methods or by other analytical methods acceptable to purchaser. The total volume or mass percent of all fluid constituents shall conform to the percentages shown in Table 2, determined in accordance with the indicated test procedures.

TABLE 2 - FLUID COMPOSITION

Constituents			Volume %	Mass %	Test Procedures
Paraffins	Total		74.2 ± 1%		(Remainder)
		Exxsol D-40 [1]	37.1		
		Exxsol D-80 [1]	37.1		
Aromatics	Total		25 ± 1%		ASTM D 1319 or ASTM D 6379
		Aromatic 100	7.5 ± 0.5%		
		Aromatic 150	15.0 ± 0.5%		
		Aromatic 200	2.5 ± 0.5%		
Sulfur	Tertiary-Butyl Disulfide		0.73 [2]	0.3 ± 0.02	ASTM D4294, ASTM D 1266, or ASTM D 2622
Mercaptan	1-Decanethiol		0.010 [2]	0.002 ± 0.0005	ASTM D 3227
Fuel System Icing Inhibitor	MIL-DTL-85470 (DiEGME)		0.15 ± 0.02		ASTM D 5006
Lubricity Improver/Corrosion Inhibitor [3]	MIL-PRF-25017		0.0017 ± 0.0002		

[1] Hydrocarbon blends must contain no more than 0.5% aromatics (See 8.3 for vendor information)
[2] Volume percents provided as estimates; mass percent shall be measured
[3] Unicor J was used in initial test program

3.2.1.1 The fluid shall be stored out of contact with light in containers which are inert to the fluid ingredients (See 5.1.1)

3.2.1.2 The fluid shall be stored below 80 °F (27 °C). Refrigeration at 40 °F (4 °C) of the fuel is not required but is recommended to maximize constituent stability.

3.2.2 Type 2 Fluid

Type 2 fluid shall be produced by blending the individual components of Type 1 fluid in amber glass containers and then adding 0.50 ppm by weight each of copper and cadmium ions.

3.2.2.1 Prior to blending in the copper and cadmium ions, the admixture shall contain less than 0.05 ppm by weight copper or cadmium, determined by wet chemical methods or by spectrographic procedures designed to analyze trace quantities of metals in organic mixtures.

3.2.2.2 The copper and cadmium ions shall be added from a standard reference concentrate containing copper and cadmium naphthenates dissolved in a mixture certified to contain 500 ppm by weight copper and 500 ppm by weight cadmium. Add 1.0 mL of this concentrate to 999 mL of the Type 1 fluid.

3.2.2.3 Type 2 fluid shall be stored out of contact with metals (See 5.1.2).

3.2.2.4 The fluid shall be stored out of contact with light in containers which are inert to the fluid ingredients (See 5.1.1)

3.2.2.5 The fluid shall be stored below 80 °F (27 °C). Refrigeration at 40 °F (4 °C) of the fuel is not required but is recommended to maximize constituent stability.

3.3 Quality

The fluid, as received by purchaser, shall be a clear, homogeneous liquid free from solid particles and from other foreign materials detrimental to usage of the fluid.

3.4 Shelf Life

Shelf life of Type 1 and 2 fluids shall be 90 days when stored below 80 °F (27 °C). If not used within 90 days after blending, the fluid may be retested for shelf life extension per 4.3.

3.5 Properties

The fluid shall conform to the requirements shown in Table 2, determined in accordance with the specified test methods:

TABLE 3 - PROPERTIES

Paragraph	Property	Requirement	Test Procedures (Paragraph)
3.5.1	Color	No darker than +25 (Saybolt Chromometer)	ASTM D 156
3.5.2	Acid Number	0.10, max	ASTM D 3242 or ASTM D 664
3.5.3	Copper Strip Corrosion	Not to exceed classification No. 1, at 120 °F (49 °C)	ASTM D 130
3.5.4	Water Tolerance	Shall exhibit sharp separation from water layer. No evidence of emulsion, precipitate, or suspended matter within or on either layer. Change in volume of either layer: 2 ml, max	ASTM D 1094

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The fluid supplier shall supply all samples for supplier'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

Tests for all composition and property requirements are acceptance tests and preproduction tests and shall be performed prior to or on the initial shipment of fluid to a purchaser, on each lot, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.1 Acceptance Tests:

Each lot of fluid shall be visually examined for quality (3.3) and tested for compliance to fluid composition requirements of Table 2 and property requirements of Table 3. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.2.1.1 A lot shall be all fluid produced in one continuous manufacturing operation from the same batches of raw materials and presented for supplier's inspection at one time.

4.2.1.2 When a statistical sampling plan has been agreed upon by purchaser and supplier, sampling shall be in accordance with such plan in lieu of sampling as in 4.4.1 and the report of 4.5 shall state that such plan was used.

4.2.2 Preproduction Tests

As agreed upon by purchaser and supplier.

4.3 Shelf-Life Surveillance and Updating

Inspections to be conducted for shelf-life extension are aromatic content and mercaptan content in accordance with test methods indicated in Table 2. If composition requirements (Table 2) for aromatic and mercaptan content are met, the shelf life may be extended an additional 90 days. Additional 90-day shelf life extensions require verification of all fluid composition and property requirements in accordance with Tables 2 and 3.

4.4 Approval

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

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

4.5 Reports

The fluid supplier shall furnish with each shipment a report showing the results of tests to determine conformance to the fluid composition and property requirements. This report shall include the purchase order number, lot number, AMS2629D, supplier's material identification, and quantity.

4.5.1 A material safety data sheet shall be supplied to each purchaser prior to, or concurrent with, the report of preproduction test results or, if preproduction testing be waived by purchaser, concurrent with the first shipment of fluid for production use. Each request for modification of fluid formulation shall be accompanied by a revised data sheet 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 fluid may be based on the results of testing three additional fluid samples for each original nonconforming sample. Failure of any retest sample to meet the specified requirements shall be cause for rejection of the fluid represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Packaging and Identification

5.1.1 Type 1 fluid shall be packaged in containers, such as welded aluminum, non-galvanized welded steel, or glass, which are inert to the fluid ingredients.

5.1.2 Type 2 fluid shall be packaged in amber glass containers only.