



AEROSPACE MATERIAL SPECIFICATION

AMS3023™**REV. D**

Issued 1995-05
Reaffirmed 2003-11
Revised 2024-08

Superseding AMS3023C

Fluid, Reference for Testing Polyol Ester (and Diester) Resistant Material

RATIONALE

Para 8.7 says Mobil Jet Oil II (O-1D) per MIL-PRF-23699 is an acceptable substitute, but O-1D is unavailable. Hence, delete O-1D and instead rephrase as Mobil Jet Oil II per MIL-PRF-23699 is an acceptable substitute. This was agreed to in 5-8-24 CE Wednesday telecon.

1. SCOPE

1.1 Form

This specification covers a trimethylol propane triheptanoate fluid (see 8.2) representative of standard type (SPC) gas turbine engine oils.

1.2 Application

This fluid has been used typically to evaluate the ability of elastomeric and other polymeric materials to conform to designated requirements after contact with, or immersion in, gas turbine lubricants such as those conforming to MIL-PRF-7808, MIL-PRF-23699 Grade Std, and AS5780 Grade SPC. This fluid is not representative of high thermal stability lubricants such as those conforming to MIL-PRF-23699 class HTS or AS5780 class HPC. AMS3085 (Reference Oil 300) should be used where elastomer compatibility with such gas turbine lubricants is required. This fluid is not intended for operational use in gas turbine engines (see 8.2).

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 that 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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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<https://www.sae.org/standards/content/AMS3023D>

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS3085	Fluid, Reference for Testing AS5780 HPC Class (Polyol) Resistant Material (Also known as Eastman Reference Oil 300)
AMS3217/4	Test Slabs, Fluoroelastomer (FKM), 65 - 75
ARP5088	Test Method for the Determination of Total Acidity in Polyol Ester and Diester Gas Turbine Lubricants by Automatic Potentiometric Titration
AS5780	Specification for Aero and Aero-Derived Gas Turbine Engine Lubricants

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 D445	Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)
ASTM D471	Rubber Property - Effect of Liquids
ASTM D1298	Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
ASTM D4057	Manual Sampling of Petroleum and Petroleum Products
ASTM D6304	Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration

2.3 ANSI Accredited Publications

Copies of these documents are available online at <https://webstore.ansi.org/>.

ANSI Z400.1	Material Safety Data Sheets
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2.4 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-PRF-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-PRF-23699	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, NATO Code Numbers: O-152, O-154, O-156, and O-167
MIL-STD-2073-1	Standard Practice for Military Packaging

3. TECHNICAL REQUIREMENTS

3.1 Material

Fluid shall consist of a refined ester base stock and commercial additives to the percentages by weight shown in Table 1. Conformance to Tables 2 and 3 shall be used in lieu of chemical analysis to validate composition (see 8.3).

Table 1 - Fluid composition

Component	Min	Max
Trimethylol Propane Triheptanoate	95.9	96.1
Tricresyl Phosphate	1.9	2.1
Phenyl- α -naphthyl-amine	0.9	1.1
P, P' Dioctyl Diphenylamine	0.9	1.1

3.2 Properties

The fluid shall conform to the requirements shown in Table 2; tests shall be performed on the fluid supplied and in accordance with specified test methods.

Table 2 - Physical property requirements

	Property	Requirement	Test Method
3.2.1	Specific Gravity		ASTM D1298
	60/60 °F (16/16 °C)	0.964 $\pm$ 0.010	
3.2.2	Viscosity		
	100 °F (38 °C)	14.5 cSt $\pm$ 0.5 cSt	ASTM D445
	212 °F (100 °C)	3.5 cSt $\pm$ 0.25 cSt	
3.2.3	Total Acid Number	0.05 mg KOH/g $\pm$ 0.05 mg KOH/g	ARP5088
3.2.4	Total Water	500 ppm, maximum	ASTM D6304

3.3 Elastomer Compatibility

Tests shall be conducted on standard fluorocarbon elastomer stock (FKM), refer to AMS3217/4, aged in fluid at 392 °F $\pm$ 5 °F (200 °C $\pm$ 3 °C) for 70 hours $\pm$ 0.5 hour. Properties shall be determined in accordance with ASTM D471.

Table 3 - Elastomer compatibility

Property	Requirement
Volume Change	+1 to +25%
Tensile Strength Decrease, Maximum	35%
Elongation Decrease, Maximum	20%
Hardness Change	+0 to -15 points

3.4 Quality

The fluid, as received by the purchaser, shall be uniform in quality and condition and free from sediment, suspended matter, and other foreign materials.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The manufacturer of the fluid shall supply all samples and shall be responsible for the performance of all required tests. The purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the fluid conforms to specified requirements.

4.2 Classification of Tests

All technical requirements are acceptance tests and shall be performed on each lot prior to shipment of fluid by the manufacturer.

4.3 Sampling and Testing

Shall be in accordance with ASTM D4057. 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.

4.3.1 A lot shall be all fluid from one batch presented for the manufacturer's inspection at one time.

4.4 Approval

If requested by the purchaser, sample fluid shall be submitted for approval by the purchaser before fluid for production use is supplied. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, the manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample fluid (see 8.3). Production fluid made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports

The supplier of the fluid shall furnish with each shipment a report from the manufacturer showing the composition and the results of tests to determine conformance to the technical requirements and stating that the fluid conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS3023D, manufacturer's identification, and quantity.

A material safety data sheet conforming to ANSI Z400.1, or equivalent, shall be supplied to each purchaser prior to or with the first shipment of the fluid.

5. PREPARATION FOR DELIVERY

5.1 Packaging and Identification

5.1.1 A lot of fluid may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.

5.1.2 The fluid shall be packaged in airtight containers of such size and design as to keep ullage to a minimum.

5.1.3 Each container of fluid shall be legibly identified, with not less than the following information on an attached label, using characters that will not be obliterated by normal handling:

FLUID, REFERENCE FOR TESTING POLYOL ESTER (AND DIESTER) RESISTANT MATERIAL

AMS3023D

PURCHASE ORDER NUMBER _____

MANUFACTURER'S IDENTIFICATION _____

LOT (OR BATCH) NUMBER _____

QUANTITY _____

APPROPRIATE WARNINGS OR PRECAUTIONARY NOTICES _____

5.1.4 Containers of fluid shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the fluid to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

A supplier shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Fluid not conforming to this specification, or to modifications authorized by the purchaser, will be subject to rejection.