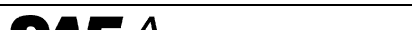


|                                                                                                                      |                                                 |                                                         |        |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------|--------|
| <br><i>An SAE International Group</i> | <b>AEROSPACE<br/>MATERIAL<br/>SPECIFICATION</b> | <b>SAE</b> AMS3023                                      | REV. A |
|                                                                                                                      |                                                 | Issued 1995-05<br>Reaffirmed 2003-11<br>Revised 2013-11 |        |
|                                                                                                                      |                                                 | Superseding AMS3023                                     |        |
| Fluid, Reference for Testing Polyol Ester (and Diester) Resistant Material                                           |                                                 |                                                         |        |

## RATIONALE

This is the 5-year review and reaffirmation of this specification with minor editorial changes.

### 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 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 cancelled 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 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](http://www.sae.org).

AMS2825 Material Safety Data Sheets

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

## 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](http://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 D6304 Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration

ASTM D4057 Manual Sampling of Petroleum and Petroleum Products

## 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-7808 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base

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 Table 2 and Table 3 shall be used in lieu of chemical analysis to validate composition (See 8.3).

TABLE 1 - COMPOSITION

| Component                         | min  | max  |
|-----------------------------------|------|------|
| Trimethylol Propane Triheptanoate | 95.9 | 96.1 |
| Tricresyl Phosphate               | 1.9  | 2.1  |
| Phenyl-alpha-naphthyl-amine       | 0.9  | 1.1  |
| P, P' Dioctyl Diphenylamine       | 0.9  | 1.1  |

### 3.2 Properties

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

TABLE 2 - PROPERTIES

|       | Property                                       | Requirement                      | Test Method |
|-------|------------------------------------------------|----------------------------------|-------------|
| 3.2.1 | Specific Gravity<br>60/60 °F (16/16 °C)        | 0.964 ± 0.010                    | ASTM D1298  |
| 3.2.2 | Viscosity<br>100 °F (38 °C)<br>212 °F (100 °C) | 14.5 cSt ± 0.5<br>3.5 cSt ± 0.25 | ASTM D445   |
| 3.2.3 | Total Acid Number                              | 0.05 mg KOH/g ± 0.05             | SAE ARP5088 |
| 3.2.4 | Total Water                                    | 500 ppm, max                     | ASTM D6304  |

### 3.2.5 Elastomer Compatibility

Tests shall be conducted on standard fluorocarbon elastomer stock (FKM), AMS3217/4, aged in fluid at 392 °F ± 5 (200 °C ± 3) for 70 hours ± 0.5. Properties shall be determined in accordance with ASTM D 471.

TABLE 3 - ELASTOMER COMPATIBILITY

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

### 3.3 Quality

The fluid, as received by 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. 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 manufacturer's inspection at one time.

#### 4.4 Approval

If requested by 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, 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 product 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 product conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3023A, manufacturer's identification, and quantity.

A material safety data sheet conforming to AMS2825, 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 which will not be obliterated by normal handling.

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

AMS3023A

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 purchaser, will be subject to rejection.

### 8. NOTES

- 8.1 A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revision. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.