

FLUID, REFERENCE  
FOR TESTING DI-ESTER (POLYOL) RESISTANT MATERIAL

1. SCOPE:

1.1 Form: This specification covers a neopentyl polyol ester fluid.

1.2 Application: Primarily to evaluate the ability of polymeric compounds to conform to designated requirements after immersion in the fluid at a specific temperature for a specified time, as required by an applicable specification.

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 Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale PA 15096.

AMS 2350 - Standards and Test Methods

AMS 2825 - Material Safety Data Sheets

SAE Technical Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

AMS documents are protected under United States and International copyright laws. Reproduction of these documents by any means is strictly prohibited without the written consent of the publisher.

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D445 - Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)

ASTM D664 - Neutralization Number by Potentiometric Titration

ASTM D1218 - Refractive Index and Refractive Dispersion of Hydrocarbon Liquids

ASTM D1298 - Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

ASTM D1744 - Water in Liquid Petroleum Products by Karl Fischer Reagent

ASTM D4057 - Manual Sampling of Petroleum and Petroleum Products

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Material: The test fluid shall consist of a carefully refined product of neopentyl ester with 0.5% phenothiazine added as an antioxidant.

3.2 Properties: The product shall conform to the following requirements, determined in accordance with specified ASTM methods:

3.2.1	Specific Gravity at 60°/60°F (16°/16°C)	0.961 - 0.967	ASTM D1298
3.2.2	Viscosity at 100°F (38°C)	14.60 - 15.60 cs	ASTM D445
3.2.3	Viscosity at 210°F (99°C)	3.0 - 4.0 cs	ASTM D445
3.2.4	Acid Number, maximum	0.10 mg KOH/g	ASTM D664
3.2.5	Water Content by weight, maximum	0.10%	ASTM D1744
3.2.6	Refractive Index at 73°F (23°C)	1.449 - 1.455	ASTM D1218
3.2.7	C <sub>7</sub> Acid Component, minimum	93%	4.5
3.2.8	Hydroxyl Content, maximum	0.1%	4.5

3.3 Quality: The fluid, as received by purchaser, shall be free from  
 ∅ water, sediment, and suspended matter. The odor shall not be irritating or nauseating. No substance of known dangerous toxicity under normal conditions of handling and use shall be present.

#### 4. QUALITY ASSURANCE PROVISIONS:

- 4.1 Responsibility for Inspection: The vendor of fluid shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. 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 to determine conformance to all technical requirements of this specification are classified as acceptance tests and as 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 material and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.
- 4.2.1 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: 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 or tank presented for vendor's inspection at one time and shall not exceed 5000 gallons (18,927 L). A lot may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.
- 4.3.2 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as 4.3 and the report of 4.6.1 shall state that such plan was used.
- 4.4 Approval:
- 4.4.1 Sample fluid shall be approved by purchaser before fluid for production use is supplied, unless such approval be waived by purchaser. Results of tests on production fluid shall be essentially equivalent to those on the approved sample fluid.
- 4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production fluid which are essentially the same as those used on the approved sample fluid. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor 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 Test Methods: Shall be as agreed upon by purchaser and vendor for determining the C<sub>7</sub> acid component (3.2.7) and hydroxyl content (3.2.8).

4.6 Reports: The vendor of fluid shall furnish with each shipment a report showing the results of tests to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, AMS 3021A, lot number, and quantity.

4.6.1 A material safety data sheet conforming to AMS 2825, or equivalent, 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 product formulation shall be accompanied by a revised data sheet for the proposed formulation.

4.7 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 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 and no additional testing shall be permitted. Results of all tests shall be reported.

## 5. PREPARATION FOR DELIVERY:

### 5.1 Packaging and Identification:

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

5.1.2 Each container of fluid shall be identified, with not less than the following information on an attached label, using characters of such size as to be legible and which will not be obliterated by normal handling:

FLUID, REFERENCE, FOR TESTING DI-ESTER (POLYOL) RESISTANT MATERIAL  
AMS3021A  
PURCHASE ORDER NUMBER \_\_\_\_\_  
MANUFACTURER'S IDENTIFICATION \_\_\_\_\_  
LOT (OR BATCH) NUMBER \_\_\_\_\_  
QUANTITY \_\_\_\_\_  
APPROPRIATE WARNINGS OR PRECAUTIONARY NOTICES \_\_\_\_\_

5.1.3 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. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.1.4 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-794, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.1 and 5.1.3 will be acceptable if it meets the requirements of Level C.