Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3021

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

1. SCOPE: This specification covers a neopentyl polyol ester fluid for use as a reference test fluid 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.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2825 - Material Safety Data Sheets

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

ASTM D270 - Sampling Petroleum and Petroleum Products
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, 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

2.3 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 polyol 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 (15.6°/15.6°C)	0.961 - 0.967	ASTM D1298
3.2.2 Viscosity at 100°F (37.8°C)	14.60 - 15.60 cs	ASTM D445

Printed in U.S.A.

3.2.3	Viscosity at 210°F (98.9°C)	3.0 - 4.0 cs	ASTM D445
3.2.4	Acid Number, max	0.10 mg KOH/gm	ASTM D664
3.2.5	Water Content by weight, max	0.10%	ASTM D1744
3.2.6	Refractive Index at 73°F (22.5°C)	1.449 - 1.455	ASTM D1218
3.2.7	C_7 Acid Component, min	93%	4.5
3.2.8	Hydroxyl Content, max	0.1%	4.5

3.3 Quality: The fluid shall be free from water, sediment, and suspended matter. The odor shall not be nauseating or irritating. 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 and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the fluid conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.

4.2.2 Qualification Tests: Tests to determine conformance to all technical requirements of this specification are classified as qualification tests and shall be performed on the initial shipment of fluid to a purchaser, when a change in material or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing is required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, qualification test fluid shall be submitted to the cognizant qualification agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be in accordance with ASTM D270, unless otherwise specified. The number of specimens for each test 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 submitted for vendor's inspection at one time and shall not exceed 5000 gal (18,900 L). A lot may be packaged in smaller quantities as specified in 5.1.1 as long as the basic 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 in 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. 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, and methods of routine inspection on production fluid which are essentially the same as those used on the approved sample fluid. If any change is necessary in ingredients or in manufacturing procedures, vendor shall submit for re-approval a statement of the proposed changes in ingredients and 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 C7 acid component and hydroxyl contents.

4.6 Reports:

4.6.1 The vendor of fluid shall furnish with each shipment three copies of a report showing the results of tests on each lot to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, material specification number, lot number, and quantity.

4.6.2 A material safety data sheet conforming to AMS 2825 shall be supplied to each purchaser prior to, or concurrent with, the report of qualification test results or, if qualification testing be waived by purchaser, concurrent with the first shipment of fluid for production use. Each request for modification of 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 by an attached label, using characters of such size as to be clearly legible and which will not be obliterated by normal handling. Each label shall show not less than the following information:

REFERENCE FLUID FOR TESTING DI-ESTER (POLYOL) RESISTANT MATERIAL
AMS 3021
MANUFACTURER'S MATERIAL DESIGNATION _____
PURCHASE ORDER NUMBER _____
LOT (OR BATCH) NUMBER _____
QUANTITY _____
APPROPRIATE WARNINGS OR PRECAUTIONARY NOTICES _____

5.1.3 The 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.