



AEROSPACE RECOMMENDED PRACTICE

ARP6917™

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Evaluation of Gas Turbine Engine Lubricant Compatibility with Elastomer Slabs - Long Duration Test

RATIONALE

This SAE Aerospace Recommended Practice is intended to determine the compatibility of aviation propulsion system grade elastomers with the aviation lubricants that they may be exposed to during service, such as AS5780 Gas Turbine Engine Lubricants. Properties of such elastomeric materials may deteriorate during exposure to aviation lubricants, thereby affecting their performance capabilities and potentially result in part failure. This test was initially developed as a Safran Aircraft Engine test used to approve new synthetic turbine oils.

1. SCOPE

This test method provides procedures for exposing specimens of elastomer material (slab form) representative to those used in gas turbine engines to aviation lubricants under extended duration and engine relevant thermal conditions. For AS5780 requirements the time is at least 1800 hours and temperatures are 100 °C to 160 °C. Positive volume change is an indication of specimen swell and subsequent negative volume change is an indication of specimen deterioration, both properties are important in the evaluation of the compatibility of the lubricant with elastomers used in the construction of the gas turbine.

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications

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

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

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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 Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity).

ASTM D2240 Standard Test Method for Rubber Property - Durometer Hardness

2.3 OEM Reference

Test Parameters Document from Eric Dubois (Snecma Motors) - April 2005

3. WARNING

This document may involve hazardous materials, operations, and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

4. APPARATUS

4.1 Glassware - 500 mL reagent bottle, wide neck (alternately described as wide mouth) with ground glass stoppers, both bottles and stoppers constructed from borosilicate glass.

4.2 Balance - Capable of determining mass to 0.1 mg accuracy. Density kit for balance is recommended.

4.3 Laboratory oven - Forced air convection, capable of maintaining temperatures up to 200 °C.

4.4 Graduated cylinders and beakers for workup and cleaning.

4.5 Long set of forceps.

4.6 Rubber stopper punch or leather punch to make 3 to 5 mm hole is an option if there is a need to hang specimens in water when measuring density (if balance density kit does not include specimen basket).

5. REAGENTS AND/OR MATERIALS

5.1 Test Elastomer Specimens

5.1.1 Each elastomer type to be evaluated must be slab material 50 x 25 x 2 mm.

5.1.2 Tolerances for the elastomer slab specimens will be ± 2 mm for length and width. This should allow the yield of 15 specimens from a standard test plaque available from the source listed in 5.1.4.

5.1.3 Three elastomer specimen replicates are required for each lubricant/elastomer material/temperature combination to be tested.

5.1.4 FKM slab specimens are AMS3217/4 test plaques available from Akron Rubber Development Laboratory, Inc. (<http://www.ardl.com/test-plaques>). These test specimens are similar to the French specification NFL 17-164.